THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. XCII. No. 2220.] LONDON, NOVEMBER 28, 1905. [57TH YEAR. PRICE 6d.

PARKER & LESTER,

— *ESTABLISHED 1830.* —

MANUFACTURERS AND CONTRACTORS. **ORMSIDE STREET, LONDON, S.E.**

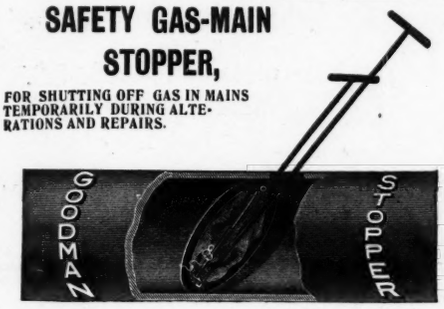
THE ONLY MAKERS OF

PATENT ANTIMONY PAINT & PARKER'S IMPERIAL BLACK VARNISH.

OXIDE PAINTS, OILS, AND GENERAL STORES, FOR GAS AND WATER WORKS.

SAFETY GAS-MAIN STOPPER,

FOR SHUTTING OFF GAS IN MAINS TEMPORARILY DURING ALTERATIONS AND REPAIRS.



SHORT'S PATENT

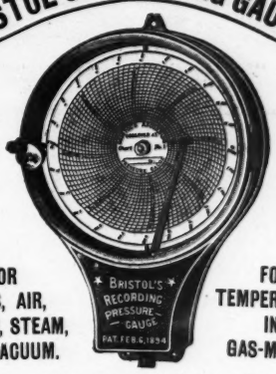
GAS-LEAK INDICATORS.

FOR GROUND USE. FLUSH BOXES ETC. HIGHLY SENSITIVE. LONG-RANGE.

FOR PURIFIER BLOW-OFF VALVES. FOR HARD USAGE.

WITH ALL LATEST IMPROVEMENTS.

BRISTOL'S RECORDING GAUGES



FOR GAS, AIR, WATER, STEAM, OR VACUUM.

FOR TEMPERATURE IN GAS-MAINS.

Many Thousands in Daily Operation.

J. W. & C. J. PHILLIPS,
23, COLLEGE HILL,
LONDON, E.C.

All Pipes Marked

"S.A.V."

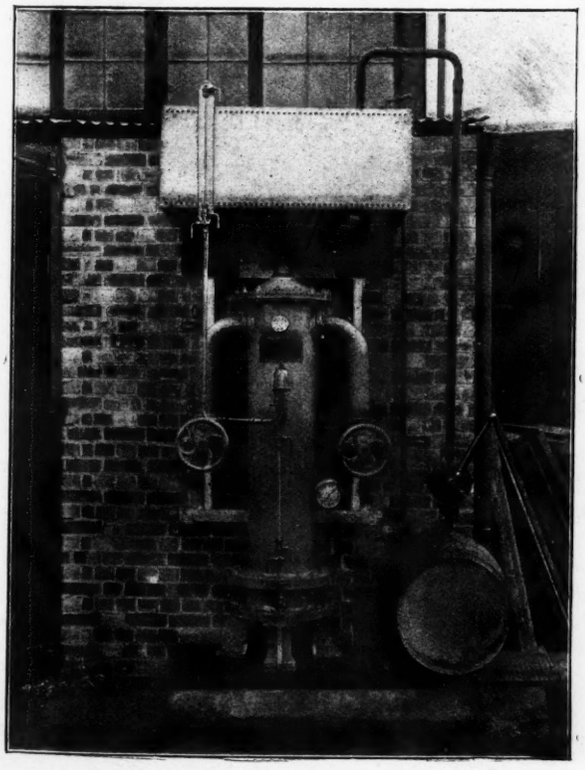
Telegrams: "AMOUR, LONDON."
Telephone Nos.: 1890 HOLBORN; CENTRAL 194.

VERTICALLY CAST IRON PIPES.

The only Foundry in Europe casting Pipes under Clarifying Process.

A. G. CLOAKE,
54, HOLBORN VIADUCT, LONDON, E.C.

BIGGS, WALL, & CO.



THE IMPROVED

"RAPID" CARBURETTOR

RELIABLE, PERMANENT, AND INSTANTANEOUS ENRICHMENT.

Dispenses with the use of Expensive Cannel.

SAVES WORRY.

INCREASES THE MAKE PER TON OF COAL AND COKE SALES.

Offices: 13, CROSS ST., FINSBURY PAVEMENT,
LONDON, E.C.

Telegraphic Address: "Ragout, London." Telephone: No. 273 Central.

Works: NEW SOUTHGATE, LONDON.

JOSEPH EVANS & SONS, CULWELL WORKS, WOLVERHAMPTON.

Telegrams: "Evans, Wolverhampton." London Address: Salisbury House, London Wall, London, E.C. National Telephone: No. 7089.

12,000 PUMPS TRADE MARK.

Please apply for Catalogue No. 8.

STOCK AND PROGRESS.

Fig. 705. "SINGLE RAM" STEAM-PUMP.

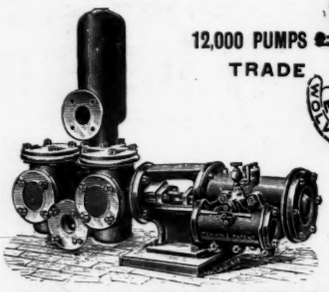


Fig. 598. "CORNISH," STEAM-PUMP FOR BOILER FEEDING, &c.

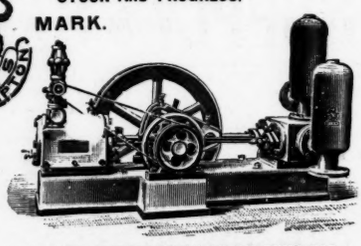


Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

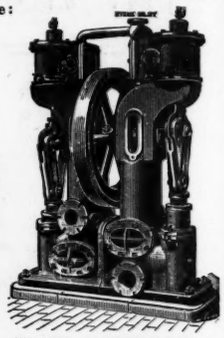


Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

PATENT ADJUSTABLE OVERFLOWS.

ENGINEERS & CONTRACTORS FOR GAS WORKS PLANT OF EVERY DESCRIPTION.

EDWARD COCKEY AND SONS, LIMITED.

LONDON OFFICE: BRIDGE HOUSE 181, QUEEN VICTORIA ST. E.C. MESSRS. BALE & HARDY, AGENTS.

PATENT WASHERS

PATENT COMBINED BYE-PASS & COMPENSATOR FOR EXHAUSTERS.

ESTIMATES AND MAKERS OF PATENTEES IMPROVED VALVES

SCREW VALVES. SEAL REGULATING VALVES. GASHOLDER VALVES. COMPENSATING VALVES. SELF ACTING BYE PASS VALVES. CENTRE DRY FACED DISC VALVES. FOURWAY VALVES. SLIDE VALVES.

CENTRE VALVES FOR WORKING 1, 2, 3, OR 4 PURIFIERS TOGETHER

1400 CENTRE VALVES HAVE BEEN SUPPLIED.

ENQUIRIES INVITED.

FREE.

THE IRONWORKS FROME, SOMERSET.

TELEGRAPHIC ADDRESS "COCKEYS FROME" "DAMPER LONDON"

ORIGINAL MAKERS OF DRY-FACED CENTRE VALVES. ESTABLISHED OVER HALF A CENTURY.

PATENT FIRE DOORS & FRAMES.

Every Description of

FIRE-CLAY GOODS

OF BEST QUALITY ONLY.

Personal attention given to all orders.

MOBBERLEY & PERRY, STOURBRIDGE.

INCLINED AND HORIZONTAL RETORTS of both Taper and Parallel Sections.

SPECIALS FOR WATER GAS PLANTS

CHECKER BRICKS ALWAYS IN STOCK

LARGE STOCKS KEPT.

THE BARROWFIELD IRON-WORKS, LIMITED,

GAS ENGINEERS & CONTRACTORS,

Telegrams: "GASOMETER GLASGOW."

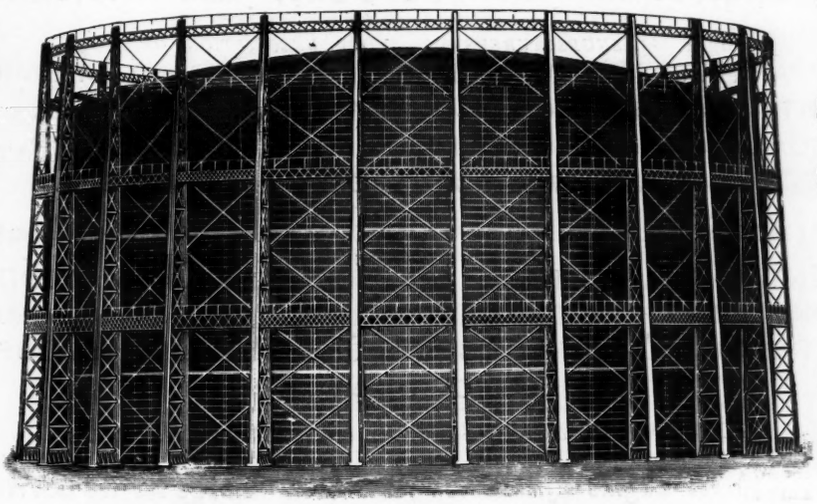
GLASGOW.

OIL PLANT AND CHEMICAL APPARATUS.

BRIDGES, GIRDERS, WHARVES PIERS.

ROOFING OF EVERY STYLE.

PIPES, VALVES, AND CONNECTIONS.



GAS APPARATUS OF EVERY DESCRIPTION.

RETORTS, CONDENSERS' SCRUBBERS. PURIFIERS.

GASHOLDERS AND TANKS.

ENGINES, EXHAUSTERS, STEAM BOILERS AND FITTINGS.

THREE-LIFT GASHOLDER. Capacity, SIX MILLION cubic feet.
240 feet Diameter by 45 feet Deep each Lift. . Erected at Glasgow.

London Office: 6, LITTLE BUSH LANE, CANNON STREET.

GEORGE ORME & CO. (Branch of Meters Ltd.)

ATLAS METER WORKS,

Tel. Address: "ORME OLDHAM."
Telephone No. 93 Oldham.

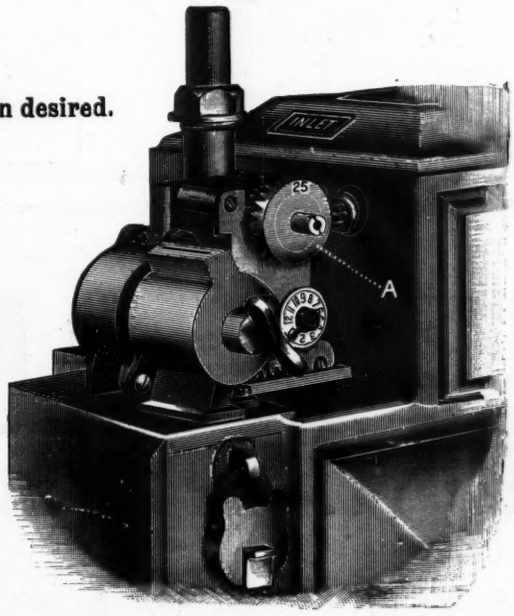
PARK STREET, OLDHAM.

"NEW CENTURY" PATTERN

Patent Coin *Prepayment Gas-Meters*

Fitted with Detachable Attachments.

Arranged for 1d., 1s., or any other Coin desired.



Change of Price effected by simply removing Crown Wheel "A" and r placing same with another Wheel.

ANY FURTHER PARTICULARS WILL BE SUPPLIED UPON APPLICATION.

NEWTON, CHAMBERS, & CO.,

LIMITED.

THORNCLIFFE IRON-WORKS, near SHEFFIELD.

Established 1790

LONDON OFFICE: **19, Great George Street, WESTMINSTER.**

Telegraphic Addresses, "NEWTON, SHEFFIELD," "ACCOLADE, LONDON."

GAS ENGINEERS, IRONFOUNDERS, and CONTRACTORS.

MANUFACTURERS OF EVERY DESCRIPTION OF

PLANT, APPARATUS, AND MACHINERY FOR GAS AND CHEMICAL WORKS.
RETORTS AND FITTINGS, MOUTHPIECES WITH SELF-SEALING LIDS.
IMPROVED COAL AND COKE HANDLING PLANT, CONVEYORS, AND ELEVATORS.
CONDENSERS, SCRUBBERS, AND WASHERS.

PURIFIERS with Planed Joints a Speciality.

PATENT CENTRE-VALVES, RACK AND SCREW VALVES, WOOD GRIDS AND SCRUBBER-BOARDS, CAST-IRON MAINS, AND SPECIALS.
STRUCTURAL WORK, COLUMNS, GIRDERS, AND ROOFING.
GASHOLDERS, CAST-IRON OR STEEL TANKS.

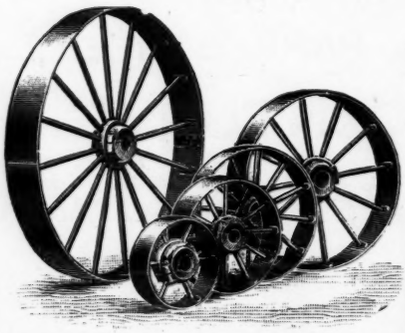
DESIGNS, SPECIFICATIONS, and ESTIMATES FREE.

PIG IRON (SPECIAL QUALITY) for Engine Cylinders. GAS COAL famous for its Unrivalled excellence.

BARRY, HENRY, & CO.,

— LIMITED. —

Specialities:
TRANSMISSION OF POWER.
Rope & Belt Pulleys,
Spur & Bevel Wheels,
Shafting & Couplings,
Pedestals, & Fixings.



Specialities:
TRANSMISSION OF MATERIALS.
Conveyors,
Elevators,
Grinding Machinery,
Motors.

WORKS:
ABERDEEN,
SCOTLAND.

AND
64, MARK LANE
LONDON, E.C.

ALL KINDS OF

MODERN GAS APPARATUS.

C. & W. WALKER, LTD.,

London Office:
110, CANNON STREET, E.C.

Midland Iron-Works:
DONNINGTON, near NEWPORT, SALOP.

IF YOUR CUSTOMER

21

Complains about the Stove you sent him giving no heat, costing a lot for gas, and stinking the place out

THAT'S WHERE WE COME IN.

THIS **"OMEGA" RAPID HEATER**

IS A MARVEL OF EFFICIENCY AND ECONOMY.

PERFECTLY ODOURLESS AND REQUIRES NO FLUE.

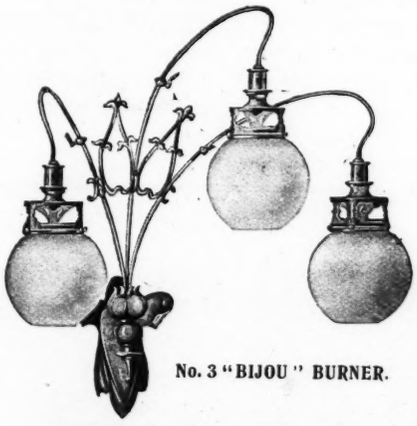
LET US SEND YOU A SAMPLE TO TEST.

THE OMEGA ODOURLESS GAS STOVE CO., LTD., WILDER ST., BRISTOL.

THE

ORIGINAL NEW INVERTED BURNERS.

The "BIJOU" BURNER is the neatest, most decorative, and economical ever known, and is the real rival to Electric Light at One-Tenth the cost.



No. 3 "BIJOU" BURNER.

All Mantles we supply are made of best double-woven Ramie, and marked with our Trade Mark,

"NICO."

No. 2 BURNER.

INVERTED FITTINGS OF EVERY DESCRIPTION AND UP-TO-DATE DESIGNS.

The New Inverted Incandescent Gas Lamp Co., Ld.

23, FARRINGDON AVENUE, LONDON, E.C.

THE SILICA FIRE-BRICK COMPANY.

OUGHTIBRIDGE.

RADIATE MORE HEAT

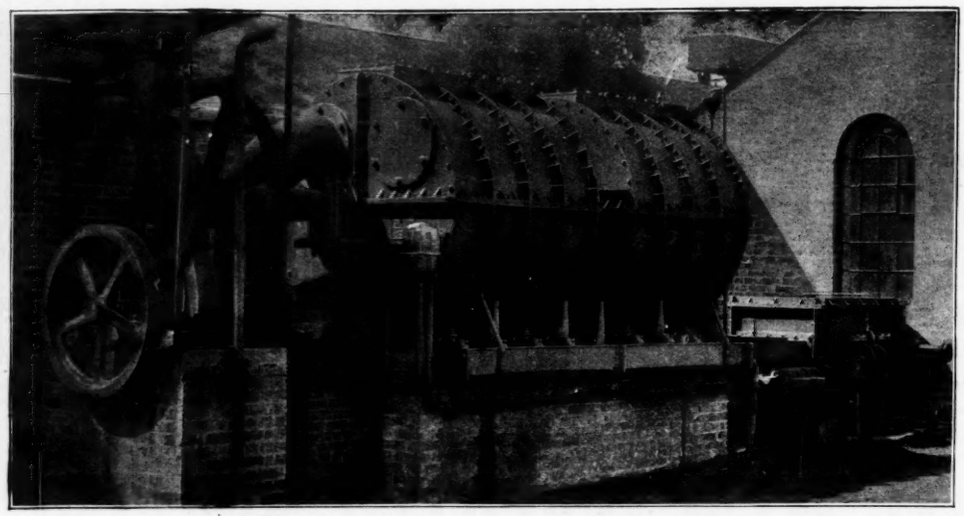
BY USING

SILCO BRICK RETORTS.

SILCO BRICKS prevent all settling of setting.

SILICA BRICKS for Combustion Chambers, any shape.

KIRKHAM, HULETT, & CHANDLER, LIMITED.



No connection with any persons of similar Names or any Firm making use of such names.

Improved Patent "STANDARD" Washer-Scrubber and Tar-Washer.

ADDRESS:—**PALACE CHAMBERS, BRIDGE STREET, WESTMINSTER, S.W.**

Sole Agents for the Berlin-Anhaltische-Maschinenbau Act. Ges. Specialities.

THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

MIDLAND AND WEST OF ENGLAND DISTRICT OFFICE: *6, CORPORATION STREET, BIRMINGHAM—Sole Agent: A. C. SCRIVENER.*
Telegraphic Address: "WIGAN, BIRMINGHAM." Telephone No. 200.

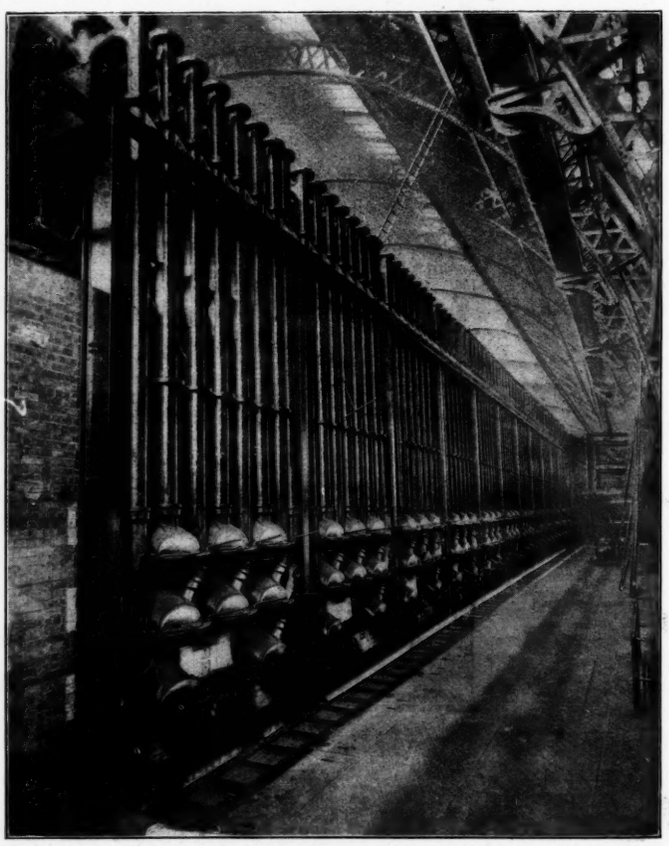
LONDON DISTRICT OFFICE: *6, STRAND, LONDON—C. PARKER & SON, Sole Agents.*
Telegraphic Address: "Parker, London."

DRAKES LTD HALIFAX.

LONDON OFFICE:
181, QUEEN VICTORIA ST., E.C.

MELBOURNE:
31, QUEEN STREET.

Inclined Retort Installation, With Hot-Coke Conveying Plant.

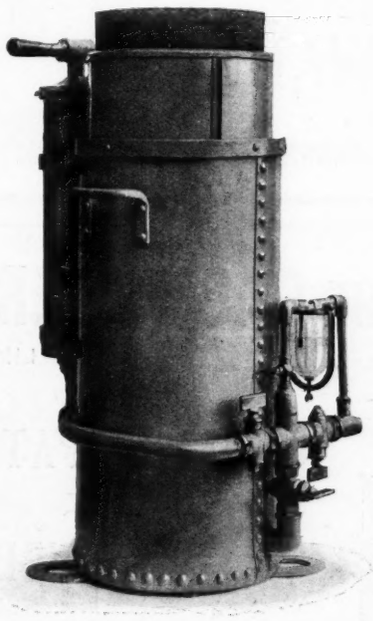


Test your

MAINS with

MILNE'S

Leak-Testing Machine.



MADE TO THROW

½ lb. or 15 lbs. per square inch.

MADE BY

JAMES MILNE & SON

LIMITED,

Milton House Works, EDINBURGH . . .

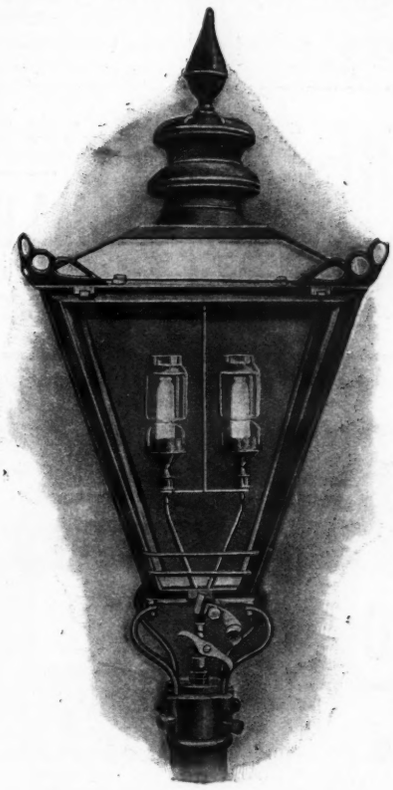
Also at LONDON, GLASGOW, and LEEDS.

BRAY'S "BAGBY" LANTERNS

For Incandescent Street Lighting.

ALL COPPER.

WIND AND RAIN PROOF.



BRAY'S No. 2 "BAGBY" LANTERN,
FITTED WITH
Enamelled Earthenware Reflector,
"Bray" Burners and
Anti-Vibrating Frame.

These Lanterns are in use in large numbers for Street Lighting in many of the principal Cities in the United Kingdom.

GEO. BRAY & CO., LTD.,

GAS LIGHTING ENGINEERS,

LEEDS.

THE 'KHOMA'
INCANDESCENT GAS-LAMP

Lamp with Globe up ready for use.

FOR EXTERIOR LIGHTING.

Patent No. 9747, 1904.

The Solution of the Problem of Outside Lighting by Incandescent Gas.

SPECIALLY RECOMMENDED TO GAS COMPANIES MAINTAINING LAMPS.

English Manufacture.

4 MANTLES—500-CANDLE POWER.

Solid Copper throughout, except Reflector, which is Enamelled Iron.

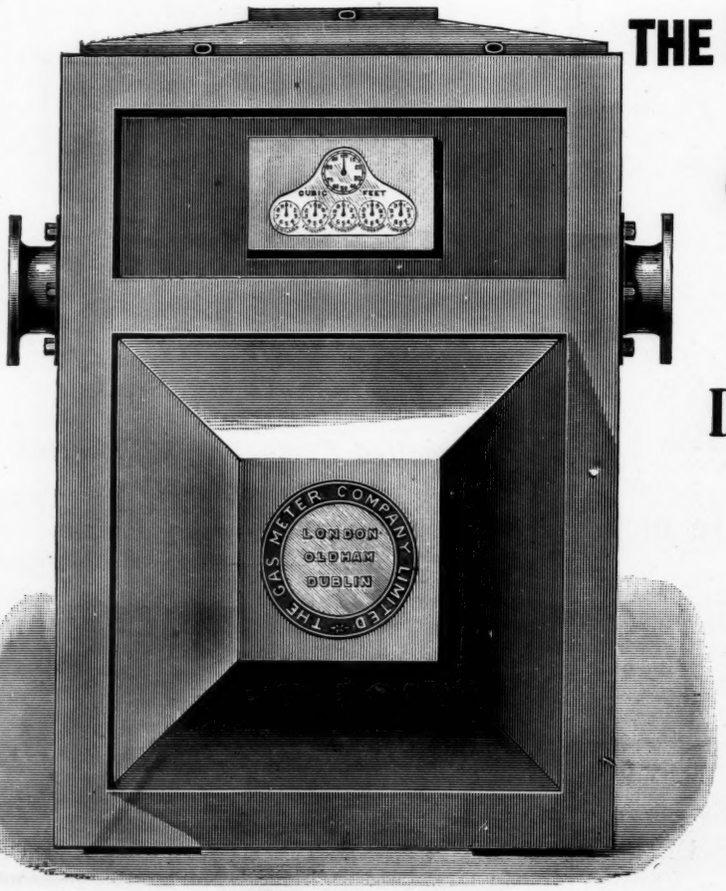
A Gas Lamp to be efficient must be maintained in perfect order, and the Globe and Chimneys kept clean. When Chimneys are used to protect Mantles they quickly become dirty, thus obscuring the light. The breakage of Chimneys also destroys a large percentage of Mantles. The "Khoma" exterior lamp eliminates the necessity of Chimneys, and enables one to clean the Globe or replace a Mantle without subjecting the other Mantles to the breeze.

KHOMA GAS ARC LAMP, LTD.

Office and Works:

96, MIDDLESEX STREET, LONDON, E.

Globe lowered, showing wind-proof shield with door open for access to Mantles. Bottom cup can be removed for Globe cleaning.



THE GAS METER CO., LIMITED

CROLL'S PATENT IMPROVED DRY GAS-METERS.

ALL SIZES IN STOCK.

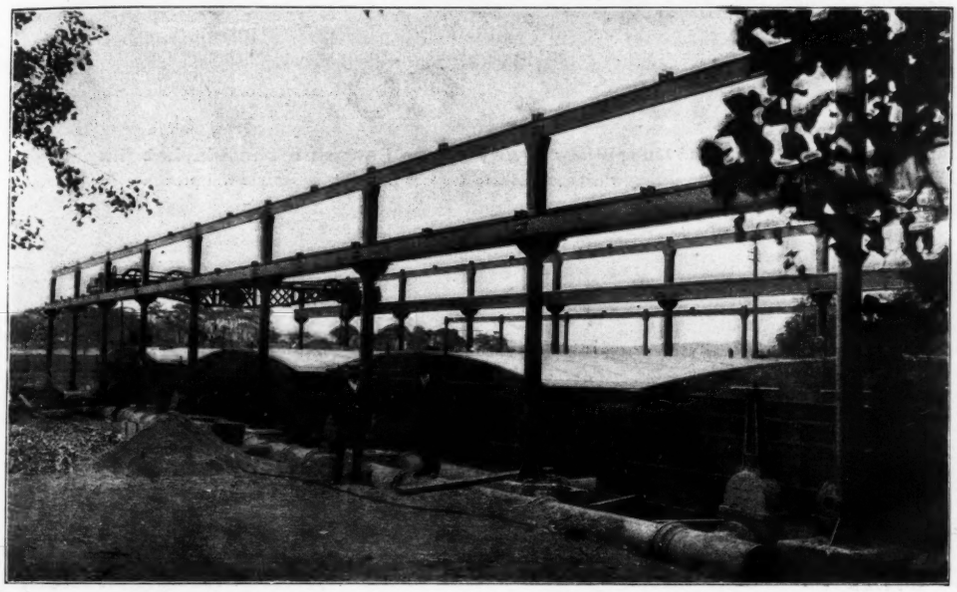
For Prices and Particulars apply to—

WORKS: 238, KINGSLAND ROAD, LONDON;
UNION STREET, OLDHAM;
HANOVER STREET, DUBLIN;
18, ATKINSON ST., MANCHESTER.

Telegraphic Addresses: "METER LONDON." "METER OLDHAM." "METER DUBLIN." "METER MANCHESTER."

Telephone Nos. 142 DALSTON (National). 840 OLDHAM (National). 1995 DUBLIN (National). 2918 MANCHESTER (National).

ASHMORE, BENSON, PEASE, & CO., LTD.,
STOCKTON-ON-TEES,



HAVE MADE ANOTHER RECORD.

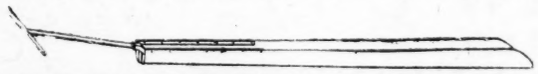
SEE BELOW.

Four Purifiers, 30 ft. square, 20-inch Connections, also Columns and Superstructure for Roof.

Order placed March 30 } 21 DAYS INSIDE
Work finished July 18 } CONTRACT TIME.

(BOURNEMOUTH.)

STEEL SCOOPS
FOR
RETORT CHARGING.
Scoops supplied with or without handles, and of any dimensions or shape required.



HENRY SYKES, Ltd., Engineers,
66, BANKSIDE, LONDON, S.E. Telephone No. 565 HOP.

LARGEST MANUFACTURERS in the UNITED KINGDOM of GAS-RETORTS,
Horizontal or Inclined; also Makers of Segmental Retorts of all Sections.

PATENTEES OF
Machine-Flanged RETORTS.

B. GIBBONS, JR., LD.
DIBDALE WORKS, DUDLEY.
TELEPHONE DUDLEY NO. 10.
Telegraphic Address: MACHINE, LOWER GORNAL.
"ABC" Code and UNICODE used for Telegrams and Cablegrams.

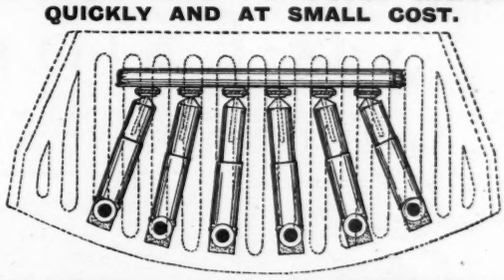
SPECIAL BRICKS & BLOCKS of every description for GENERATOR and REGENERATOR FURNACES.

Large Stocks of Bricks of all sizes, Burrs, Boiler Seating Blocks and Covers, Plain and Rebated Tiles, &c., &c.

Retorts and other Fire-Clay Goods carefully packed for export.

FOREIGN AND HOME COPIES OF ILLUSTRATED CATALOGUES ON APPLICATION.

FIT GAS-FIRES TO COAL GRATES
QUICKLY AND AT SMALL COST.



TILLEY'S (PATENTED) BURNERS
Can be Adjusted to Shape of Grate and Gas Pressure *in situ*.

TILLEY BROS.,
53, KINGSLAND ROAD, LONDON, N.E.

EVERITT'S
PATENT TAR-EXTRACTOR
As a Naphthalene Remover.

The Exhaust Steam used warms up the Tar in the Gas, and enables it to remove the maximum amount of Naphthalene. By removing the suspended Tar, none is carried forward to the Scrubbers, except in strong and thorough combination with an **EXCESS** of light hydrocarbons; and therefore no Naphthalene is freed by the action of the ammonia on the phenols in the Tar liberating Naphthalene dissolved by them.

SOLE MAKERS:
ROBERT DEMPSTER & SONS,
ROSE MOUNT IRON-WORKS, LTD.,
ELLAND, Yorks.

ENGINEERS AND MANAGERS

Should remember that where it is possible to get the same article (or a better) at the same price (or a lower) loyalty suggests that the lighting industry in this country should be supported on a basis of reciprocity. We who are constantly pressing and pushing Gas Lighting in all directions, ask and believe we shall have your support.

POND & CO.

Guarantee the Lamp as shown to be **Equal** in **Light** and **Durability** to **any other Lamp on the Market** (**imported** or otherwise), and will, without doubt, be existing when some others are "in the air" (a sample will prove).

ADVANTAGES.

Noiseless.
No Springs.
Economical.
No Stuffing Boxes.
High Power. Low Pressure.

£1 16s. 6d.

ADVANTAGES.

Windproof.
Syphon at Bottom.
Globes cannot break from expansion.
2 or 4 Burners may be used.
Cock well away from heat, at base.

59, FARRINGDON STREET.

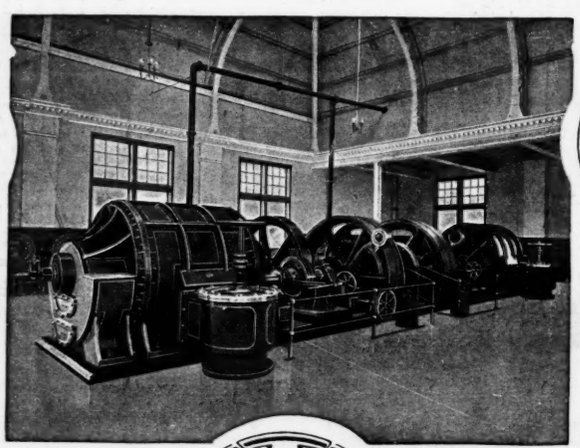
Telephone 1681 Holborn.

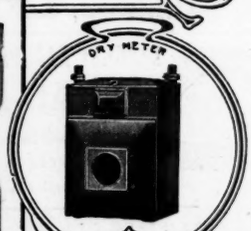
24, FARRINGDON AVENUE,

LONDON, E.C.

Manufacturers and Patentees of the "Wis" High-Power Lamp, The "Dwarf Wis" Lamp (for low ceilings), &c.

R. LAIDLAW & SON,
LIMITED
GAS & WATER ENGINEERS,





SIMON SQUARE WORKS, EDINBURGH.

6 LITTLE BUSH LANE, LONDON, E.C.

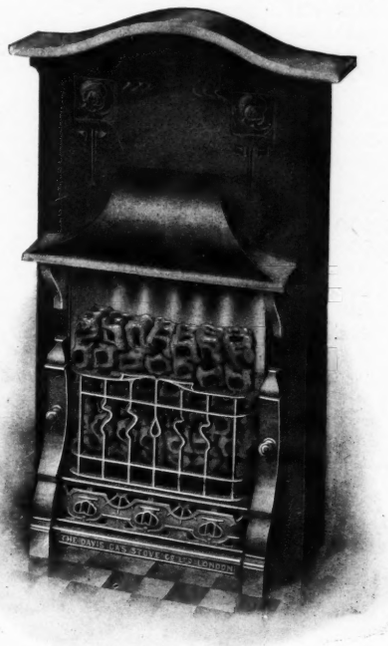
TWO EXHAUSTERS EACH TO PASS 750000 CUB. FT. PER HOUR AT 60 REVOLUTIONS PER MINUTE DRIVEN BY TWO GAS ENGINES

AND INTERMEDIATE FRICTIONAL GEARING, ERECTED AT GRANTON GAS WORKS FOR EDINBURGH & LEITH GAS COMMISSIONERS

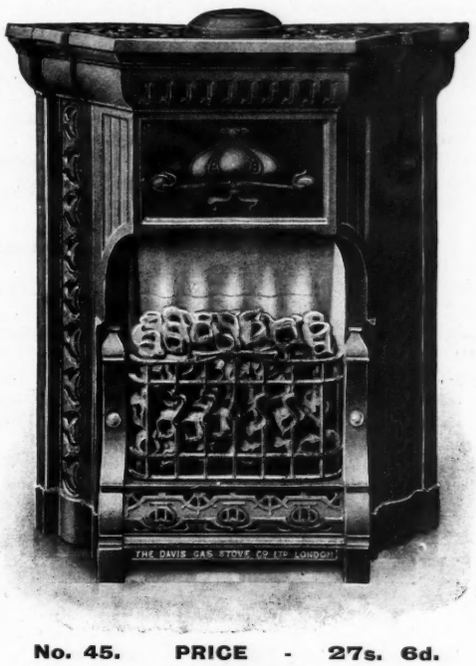
ALLIANCE FOUNDRY & ENGINEERING WORKS.
GLASGOW.

The Davis Gas Stove Co. Limited. LONDON · LUTON & FALKIRK

"Diamond" Gas-Fires.

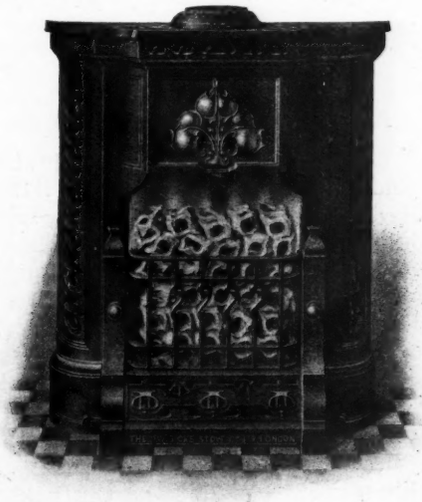


No. 15. PRICE - 35s.



No. 45. PRICE - 27s. 6d.

The "D.G."
PRICES - 15s. 6d. to 22s. 6d.



No. 55. PRICE - 22s. 6d.

The Burner is Unique. **Please ask for complete Catalogue.**

HEAD OFFICE: 200, Camberwell Road, S.E.

CITY SHOW ROOMS: 59, Queen Victoria St., E.C.

MESSRS. HUMPHREYS & GLASGOW

CARBURETTED-WATER-GAS PLANT

— DOUBLE-SUPERHEATER SYSTEM. —

	Cubic Feet Daily.		Cubic Feet Daily.		Cubic Feet Daily.
Aarhus, Denmark	800,000	G. L. & C. Co., Beckton	2,250,000	Redhill	275,000
Antwerp, Belgium	1,500,000	G. L. & C. Co., „ (2nd)	10,750,000	Redhill (Second)	300,000
Aylesbury	150,000	G. L. & C. Co., Bromley	3,750,000	Reichenberg, Bohemia	200,000
Barrow	300,000	G. L. & C. Co., Fulham	1,750,000	Romford	300,000
Bath	1,000,000	G. L. & C. Co., Nine Elms	2,750,000	Rotterdam, Holland	850,000
Belfast	1,700,000	Geneva, Switz.	500,000	Rotterdam, Holland (Second)	1,500,000
Belfast (Second)	4,500,000	Gosport	200,000	Rotterdam, Holland (Third)	750,000
Birmingham	1,500,000	Göteborg, Sweden	300,000	St. Gallen, Switz.	225,000
Bordentown, N.J.	125,000	Guildford	350,000	St. Joseph, Mo.	750,000
Bournemouth	1,000,000	Hamburg, Germany	1,750,000	Santiago de Cuba	400,000
Bremen, Germany	550,000	Hartlepool	750,000	Scarborough	800,000
Bremen, Germany (Second)	950,000	Hebden Bridge	200,000	Shanghai	225,000
Brentford	1,200,000	Heidelberg, Germany	200,000	Shanghai (Second)	225,000
Bridlington	150,000	Holyoke, Mass.	600,000	Southampton	800,000
Bridlington (Second)	200,000	Hull	1,500,000	Southampton (Second)	500,000
Brighton	1,750,000	L. & N.W. Rly., Crewe	700,000	Southgate	400,000
Brighton (Second)	1,850,000	Lawrence, Mass.	400,000	Southport	750,000
Brussels—Forest	1,000,000	Lea Bridge	350,000	Southport (Second)	900,000
Brussels—Ville	750,000	Lea Bridge (Second)	350,000	Stafford	500,000
Brussels—Ville (Second)	750,000	Liége, Belgium	1,000,000	Staines	600,000
Brussels—Ville (Third)	1,500,000	Lincoln	500,000	Stockport	600,000
Carlisle	600,000	Liverpool	3,500,000	Stockport (Second)	600,000
Chorley	300,000	Liverpool (Second)	4,500,000	Stockton-on-Tees	500,000
Commercial Gas Co.	850,000	Longton	600,000	Swansea	750,000
Commercial (Second)	850,000	Magdeburg, Germany	1,400,000	Swansea (Second)	1,000,000
Commercial (Third)	1,250,000	Maidenhead	225,000	Sydney—Harbour	500,000
Commercial (Fourth)	2,000,000	Maidenhead (Second)	225,000	Sydney—Harbour (Second)	500,000
Copenhagen	700,000	Malta	400,000	Sydney—Mortlake	500,000
Copenhagen (Second)	2,500,000	Manchester	3,500,000	Sydney—Mortlake (Second)	500,000
Coventry	600,000	Manchester (Second)	3,500,000	Syracuse, N.Y.	850,000
Coventry (Second)	600,000	McKeesport, Pa.	500,000	Taunton	225,000
Croydon	1,250,000	Merthyr Tydfil	300,000	The Hague, Holland	1,000,000
Croydon (Second)	625,000	Middlesbrough	1,250,000	Tilburg, Holland	400,000
Croydon (Third)	625,000	Newburgh, N.Y.	350,000	Tottenham	750,000
Deventer, Holland	150,000	Newburgh (Second)	250,000	Tottenham (Second)	750,000
Deventer, Holland (Second)	200,000	New York	1,200,000	Tottenham (Third)	350,000
Dorking	150,000	New York	4,000,000	Tottenham (Fourth)	1,000,000
Dublin	2,000,000	North Middlesex	150,000	Tunbridge Wells	1,000,000
Dublin (Second)	2,000,000	North Middlesex (Second)	200,000	Utrecht, Holland	1,000,000
Dunedin, N.Z.	150,000	Norwich	1,000,000	Utrecht, Holland (Second)	1,000,000
Durham	200,000	Ostend, Belgium	100,000	Waltham	400,000
Eastbourne	1,250,000	Perth, W.A.	125,000	Wandsworth & Putney	1,800,000
Edinburgh	2,000,000	Port Elizabeth, S.A.	400,000	Watford	300,000
Epsom	225,000	Portsmouth	1,000,000	Watford (Second)	350,000
Falmouth	150,000	Posen, Germany	450,000	West Ham	1,500,000
Faversham	200,000	Posen, Germany (Second)	700,000	Winchester	225,000
		Preston	1,400,000	Zwolle, Holland	200,000

AND WORK UNDERTAKEN DURING THIS SEASON AND LAST.

Dunedin, N.Z. (2nd)	275,000	Bridgwater	200,000	Zwolle, Holland (2nd)	200,000
Taunton (2nd)	350,000	West Ham (2nd)	800,000	Alkmaar, Holland	400,000
Bognor	100,000	Brieg, Silesia	100,000	Leiden, Holland	500,000
Bournemouth (2nd)	500,000	Brussels—Ville (4th)	350,000	Poole	1,500,000
Vienna	3,500,000	Innsbruck, Austria	200,000	Berlin-Rixdorf	650,000
Maastricht, Holland	200,000	Marlborough	100,000	Berlin-Charlottenburg	2,500,000
Antwerp, Belgium (2nd)	1,000,000	Flensburg, Sleswig	300,000	Bochum, Westphalia	530,000
Tottenham (5th)	1,000,000	Weston-super-Mare	300,000	Brussels–Anderlecht	350,000
The Hague, Holland (2nd)	500,000	Wexford, Ireland	100,000	Leigh, Lancs.	350,000
Hampton Court.	500,000	Budapest, Hungary	50,000	Stockport (3rd)	400,000
Lea Bridge (3rd)	400,000	Swindon.	300,000	Agram, Croatia.	200,000
Dublin (3rd).	650,000	Reading	1,000,000	Bruges, Belgium	200,000
North Middlesex (3rd)	75,000	Oberhausen, Germany	175,000	Liége, Belgium (2nd)	750,000
St. Gallen, Switz. (2nd)	225,000	Malmo, Sweden	350,000	Lemberg, Galicia	260,000
Brussels—St. Josse	1,000,000	Ipswich	750,000	Leeuwarden, Holland	400,000
Dundee	1,500,000	Winchester (2nd)	125,000	Stockholm	1,500,000

HUMPHREYS & GLASGOW TOTAL . . **164,200,000** CUBIC FEET DAILY.

UNITED GAS IMPROVEMENT CO., U.S.A. **463,000,000** CUBIC FEET DAILY.

TOTAL 627,200,000 CUBIC FEET DAILY.

36 & 38, VICTORIA STREET, LONDON, S.W.
Telegrams: "EPISTOLARY LONDON."

UNITED STATES OFFICE:
31, NASSAU STREET, NEW YORK

CONTENTS.

EDITORIAL NOTES.

GAS, &c.—

Proposed Regulations as to Private Lines and Sidings—The Home Office Inquiry. 591
Formation of the Society of British Gas Industries 591
Promised Interest for the Parliamentary Session. 592
Mr. Thomas Newbigging on Price of Gas to Possible Users of Suction-Gas Plant . 593
Taxation and a Suggestion 594
Gas for Power at Birmingham—The Ashton Gas Company's Income-Tax Appeal—Electric Lighting and Ventilation at Caxton Hall—Propping up a Municipal Electricity Works—Is a Municipal Workshop a Factory 594

Removal of Naphthalene from Coal Gas. By Dr. H. G. Colman 596
Gas Stock and Share Market 597
Electric Lighting Memoranda 597
Municipal Trading and Oppressive Rates . 599
Conference on Smoke Abatement 600
Distress and the Children 601
Manchester District Institution of Gas Engineers—Quarterly Meeting at Stockport—General Business 602
Mr. T. Newbigging on the Price of Coal Gas to Possible Users of Suction Gas and Others. 604
Mr. H. Kendrick on a New Purifier Grid and Purifying Materials. 615
The Question-Box 617
Best Type of Setting for Small Gas-Works . 612
Society of British Gas Industries—The Society Started 613
The Cost of Gas Power 614
London and Southern District Junior Gas Association—Mr. W. H. Vanner on Naphthalene Complaints. 618
Gas-Fires—Incandescent Lamps—Fittings . 619

REGISTER OF PATENTS.

Inclined Retorts and their Charging—Redman, T. & R. 620
Bill Delivery Mechanism for Meters—Gallagher, R. W. 621
Igniting and Extinguishing Apparatus for Gas-Burners—Down, H. L., and Wiseman, D. H. 621
Gas-Igniting and Extinguishing Apparatus—Down, H. L., and Wiseman, D. H. . . . 621
Suction Gas-Producers—Smith, H. F. . . . 622
Charging Gas-Retorts—Fowler, S. J. . . . 622
Supporting Inverted Incandescent Mantles—Blanchard, A. 623
Patent Notices 623

CORRESPONDENCE.

Luteless Purifier Covers 624
Removal of Naphthalene from Coal Gas . . 624

PARLIAMENTARY INTELLIGENCE.

Notices Given for Bills (Session 1906) Relating to Gas and Water Supply 625
Provisional Order Applications (Session 1906) 627

LEGAL INTELLIGENCE.

House of Lords—Ashton Gas Company *v.* Attorney-General and the Corporation of Ashton-under-Lyne. 628

MISCELLANEOUS NEWS.

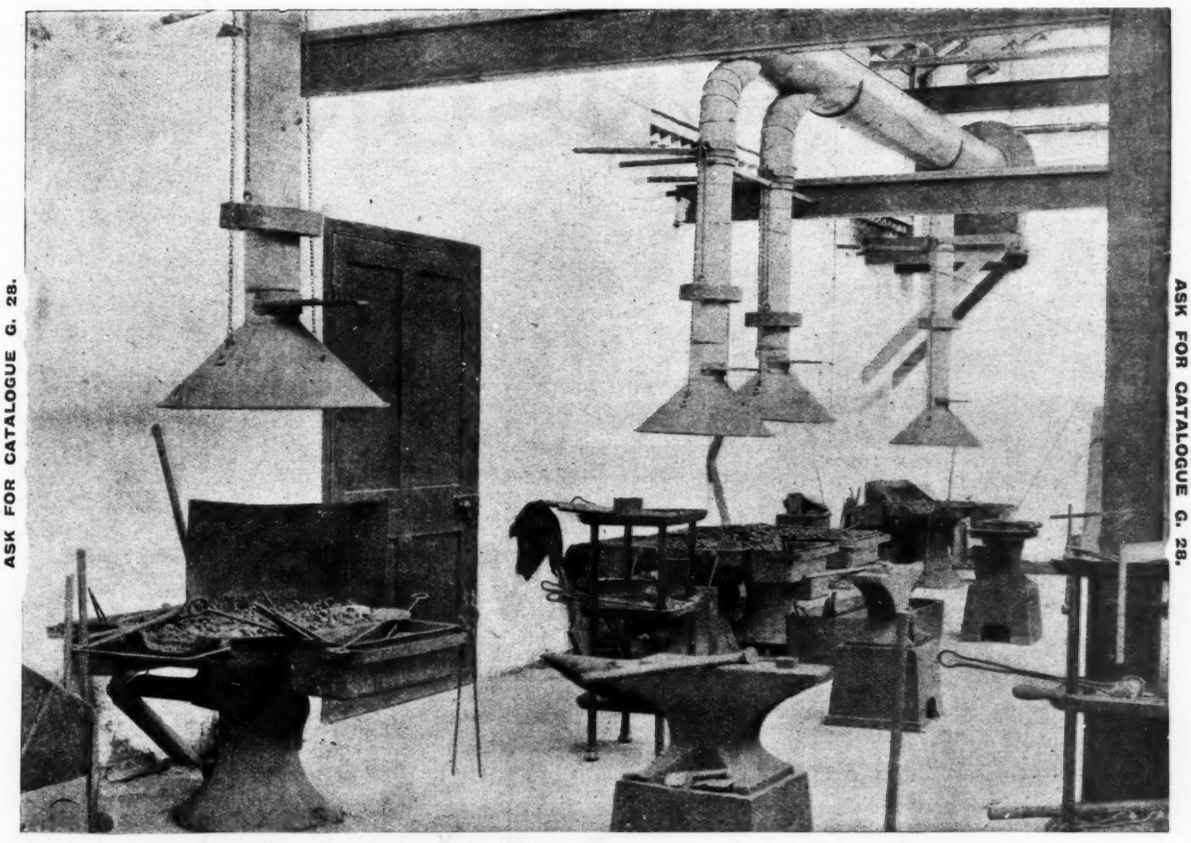
Locomotives and Waggons on Railway Sidings under the Factory Act—Home Office Inquiry; The Gas-Works' Case. 629
Proposed Gas-Works Purchase at Wigston . 628
Gas Suffocation Fatality in North London—Opening of the Inquest 630
The Gas Suffocation Case at Seaforth. . . 631
Price of Gas to Manufacturers in Birmingham 631
Continental Union Gas Company, Limited . 631
Oriental Gas Company, Limited 631
Stock and Share List 632
Bingley and the Wilsden Gas Supply—The Suggested Purchase 633

MISCELLANEOUS NEWS (*continued*)—

Competing for Gas Customers in America—Free Gas and Grocery Premiums . . . 634
Metropolitan Water Board—The Lea Valley Works. 634
Notes from Scotland 635
Current Sales of Gas Products 636
Coal Trade Reports 637
New Gasholder Tank at Prescot 637
Disposal of Water Surpluses at Carnarvon . 639

PARAGRAPHS.

The Largest Gasholder on the Continent. . 597
Midland Junior Gas Engineering Associaion. 599
Visit of Scottish Juniors to Glenboig—Tapping a Trunk Water-Main under Pressure . . 601
Producing Mixtures of Coal Gas and Water Gas 612
Masonic 613
Benzol and Toluol for Driving Motor-Cars . 616
A Minimum Wage at Manchester—Portsmouth Water Company—The Lesson of a Strike—Alleged River Pollution by the Horley Gas Company 620
Inefficient Electric Lamps at Grimsby—Electricity for Horsforth—Torpoint Gas Company 624
High-Pressure Water for Fire Extinction. . 628
Cheaper Gas for Power at Brigg 630
Dunmow Water Supply 631
The Lighting of Paignton—New Issues of Stocks and Shares—Gas for Hathersage—Proposed Water-Works Purchase at Herne Bay — Runcorn Water Supply — Leeds Plumbers and the Water Committee . . 638
Gas-Engines for Pumping Water—Incandescent Gas for School Lighting—Reduced Price for Power Gas at Bilston—Gas Poisoning Case at Hull—Gas Explosions—Leeds Gas Workers and the Six-Day Week—South Staffordshire Water Company—New Water-Works Machinery for Warrington—The Sutton Gas Company and their Sulphate Effluent 639



STURTEVANT FORGE PLANT IN GAS-WORKS,
with Up-Draught System of Smoke Removal and Adjustable Hoods.
STURTEVANT ENGINEERING CO., LTD., 147, Queen Victoria Street, London.

THOMAS GLOVER & CO.'S

PATENT NEW IMPROVED PREPAYMENT METER

For Pennies, Shillings, or any Coin.

Simple in Mechanism.
Positive in Results.
Price Changer *in Situ.*

GUARANTEED FOR FIVE YEARS.

Telegraphic Address: "GOTHIC, LONDON." Telephone No. 6159 Bank.

THOMAS GLOVER & CO., LTD.,

GAS-METER MANUFACTURERS,

LATE OF CLERKENWELL, NOW 49, QUEEN VICTORIA STREET.

Telegraphic Address: "GOTHIC, LONDON." Telephone No. 6159 Bank.

BRISTOL:	BIRMINGHAM:	MANCHESTER:	GLASGOW:	BELFAST:	MELBOURNE:
28, BATH STREET.	57 & 58, BROAD STREET.	132 & 134, CORN EXCHANGE BUILDINGS.	26, WEST NILE STREET.	8, EXCHANGE PLACE, DONEGALL STREET.	23, WRIGHT'S LANE, LONSDALE STREET.
Telegraphic Address: "GOTHIC."	*Telegraphic Address:* "GOTHIC"	*Telegraphic Address:* "GOTHIC."	*Telegraphic Address:* "GASMAIN."	*Telegraphic Address:* "GOTHIC."	
Telephone No. 1003.	Telephone No. 5009.	Telephone No. 3898.	Telephone No. 6107 Royal.		Telephone No. 3716.

PARKINSON'S

DRY METERS

PARKINSON AND W. & B. COWAN, LTD.,
(Parkinson Branch)

COTTAGE LANE, CITY ROAD, LONDON.

BELL BARN ROAD, BIRMINGHAM.

JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. XCII., No. 2220.—TUESDAY, NOVEMBER 28, 1905.

EDITORIAL NOTES—GAS, &c.

Proposed Regulations as to Private Lines and Sidings—The Home Office Inquiry.

THE crowded state of Caxton Hall last Wednesday, on the opening of the Home Office inquiry into the proposed regulations as to private lines and sidings, revealed unmistakably the magnitude of the interests which are involved in it. Over 200 industrial undertakings were represented either individually or collectively; and the array of Counsel was truly a formidable one. The objectors include practically every industry which necessitates the use of private lines or sidings on which locomotives and railway waggons are employed, from the largest railways and docks down to the comparatively small private trader. And this huge conglomeration of interests was brought together at vast expense mainly because—as it speedily transpired—the draftsman had not succeeded in making himself understood. As the learned Commissioner (Mr. Chester Jones) said at the close of the day's proceedings, "it was all a question of "drafting." If it be really so, the Home Office can have no sort of justification for running all these industries into such cost and inconvenience for the purpose of putting into proper shape the work of its officials. And that there is a great deal of truth in the observation, must be admitted by all who have watched the proceedings. At the same time, it is by no means the case that all the objections to the proposed regulations can be smoothed over by an alteration of phraseology. There is, for instance, the question of the clear distance to be observed between the sides of waggons or locomotives on adjacent lines. This, in the draft regulations, is fixed at 2 ft. 4 in., which particular measurement, it transpired during the proceedings, is based on a misunderstanding of some information received from the London and North-Western Railway Company; the 2 ft. 4 in. given by the latter not having any reference to the object for which it is employed in the draft regulations. When confronted with the possibility of the whole of the railway companies' sidings having to be relaid in the event of insistence upon this proposal, Sir Hamilton Pym Smith, the chief witness appearing for the Home Office, admitted that, in his opinion, "the distance might be the subject of "further consideration."

Nor are these the only complaints that may be fairly and properly urged against the proceedings of the Home Office in this matter. "Cutting and carving" of the draft regulations seem to have been going on almost down to the very last minute; the result being that no copies of them as finally amended were available—even for the witness who was to prove them—until the second day; and the Counsel for the Home Office (Mr. William Wills) was therefore under the necessity of reading out and explaining the nature and extent of the numerous alterations proposed. This occasioned not only uncertainty and confusion, but also great loss of valuable time. It may be reasonably asked why the Home Office did not, with their letter of Oct. 27, issue an amended draft, showing how it was intended to give effect to the concessions announced in that letter. Had this course been followed, it might have considerably simplified the present proceedings, so far as what may be termed the minor interests are concerned, since it was made clear that the objections with regard to these relate to matters of detail, and are consequently much more easy of adjustment than are those of the railway and dock companies, which relate to questions of principle. It is but fair to Sir Hamilton Pym Smith to say that, throughout the long and searching cross-examination to which he was subjected for two days, and by no fewer than 27 Counsel and others representing opponents, he showed every disposition to meet all reasonable objection; and if the regulations should be finally framed in accordance with his concessions, the gas industry, at all events, will have but little reason to complain.

Gas undertakings were, it is satisfactory to note, well represented at the inquiry; the lead being taken by the Scottish Association of Municipal Undertakings, by virtue of the seniority of their leading Counsel, Mr. Honoratus Lloyd, K.C., whose able cross-examination was adopted by the Counsel appearing for other gas undertakings and for the Institution of Gas Engineers. Much that was ambiguous in the Home Office proposals was made perfectly clear to the objectors. It is now known, for example, that "a fixed "structure" in regard to which a certain clearance is required does not apply to columns, nor apparently to piers of any sort having recesses between them; and also that the term "level crossing" requiring special provision in the shape of a bridge, tunnel, or watchman, is limited in its application to such crossings as are used by workmen as they go to and from work or meals, and does not extend to the whole length of a line of rails over which workmen may have to cross in the ordinary course of their employment. This, however, though made tolerably clear by the cross-examination, requires to be made correspondingly clear in the regulations. It is satisfactory, also, to know that the Home Office is willing to modify the regulation as to storage of material, so as to admit of such storage within the proposed limit of 3 feet from the rails, provided that it is so stored as to be "reasonably safe for walking upon." This meets the case of a heap of coal or coke the face of which slopes away from the rails at the angle of repose of such material. This concession was obtained by Mr. C. G. Hutchinson, who appeared for certain of the Suburban Gas Companies, the Reading and Bristol Companies, and the Institution of Gas Engineers. At the close of Sir Hamilton Pym Smith's cross-examination on Friday, a discussion ensued as to the course to be followed in the inquiry; and eventually it was decided to take the case of the railways and docks first—the representatives of other industries being relieved from further attendance for at least another fortnight, by which time it is hoped the final draft of the regulations will be ready for consideration.

Formation of the Society of British Gas Industries.

BY a unanimous vote, the assembly (at the Holborn Restaurant last Thursday) of members of the one section of the gas industry that were unrepresented by a central body, decided to form a Society of their own under the above title; and every broad-minded individual in the gas industry will cordially wish them the greatest success in opening up and pursuing their corporate career along the lines laid down in the stated "objects" as printed elsewhere. We cannnot conceive of a more legitimate or laudable ambition than that gas-works' contractors and manufacturers should desire, in view of their position and influence in the work of the gas industry, to have a central organization of their own; nor can we conceive of anyone enjoying the benefits and pleasures of association in any other sphere questioning the right of those engaged in the supply work of the gas industry to have a similar organization. In every way—in the report of the Committee, in the settled objects, in the rules, and in the address by Mr. Clare at the meeting—it is plainly set forth that the new Society is to be conducted so as to serve the worthiest ends. "The Committee thought it was better to aim high," says the Chairman, "and endeavour to ensure "that the Society should be based on principles which, if "carried out in their entirety, would make the gas industry "as a whole a pattern for others." There is much good work to be done, especially in co-operation with the established societies; and the means will be found for doing it.

The first meeting of members will be held in January or February; and meantime the preliminary work of organization will be carried on by the Provisional Committee. At

the meeting, the sections will be formed; and from them the Central Council constituted. As the Council can, by the rules, only consist of principals, and as principals or responsible managers only can be members, in order that they may take part in the elections, it will be to the advantage of all to send in as early as possible notifications of their desire to become members. It should be clearly understood that all the principals in a firm are eligible for membership. The question of the admission of associate members—that is to say, persons who are neither principals nor responsible managers—will be dealt with as soon as the work of the Society gets properly afloat. Immediately the Central Council is formed, then things will go ahead. We congratulate the Provisional Committee upon the success of their work; and no less the Society upon this attempt, by united action, to be of benefit to the gas industry at large, and to foster those things that shall lead to mutual advantage. We cannot deny feeling peculiarly gratified that the idea of forming such a Society was sent abroad through these columns; and this, if it be possible, adds to the warmth and sincerity of the wish that a full measure of prosperity may attend the new organization.

Promised Interest for the Parliamentary Session.

WHAT is spoken of as the "crisis" in the political situation developed by the events of last week came too late to have any effect on the preliminary stages of the preparations for next session's Private Bill Legislation; and it will depend upon the action of the Government whether or not there will be any temporary delay in prosecuting this part of the work of the session. A General Election is without doubt imminent; and the Government seem at present to be halting between resignation and dissolution, and are also undecided as to the most propitious time for appealing to the country. Meanwhile the notices of Private Bills that have been published foreshadow a session fairly rich in business and interest, to which the suburban and provincial sections of the gas industry are contributing quite a respectable share—both quantitatively and qualitatively. With the exception of a proposal for land purchase by the South Metropolitan Gas Company, the three London Companies will be resting from parliamentary warfare next year; so that it is now certain the method of gas testing, so far as they are immediately concerned, will not be heard of in the Committee-rooms during the session. Whether it will be raised on the South Suburban Company's Bill, in which will be renewed the application for a reduction of illuminating power, we have no knowledge. At the moment, the administrators of London gas affairs are awaiting the interpretation that the Gas Referees will give to the reference that has been made to them by the legislation of last session. It would be an immense convenience to have an early decision from the Referees, as several companies have announced their intention of asking Parliament to authorize a reduction of illuminating power, and to define the method of testing, and upon the latter the decision of the Referees might have considerable influence.

For last session there were only 34 Bills introduced completely or partially dealing with gas supply; next session there will be between 40 and 50. In the case of Gas Provisional Orders, too, there is an increase in the number of notices. In a large number of the measures, the powers sought are of an ordinary nature—such as capital enlargement, conversion and consolidation, extensions of works and limits of supply, land powers, and general regulations; but until the Bills are issued, nothing very definite can be said about any of these matters. It is noticed that the Tottenham Company will be among those who will ask for power for giving preference in the issue of new capital to employees and consumers. The South Suburban Gas Company's Bill and the Tottenham Company's Bill are two that will be watched with especial interest. The former in view of the further attempt that the indomitable Chairman of the Company (Sir George Livesey) and his colleagues will make to consummate the long-entertained desire to reduce the illuminating power to a point more consistent with the present-day uses of gas. There is not the slightest doubt that success would have been theirs last year, had the test-burner question been settled, before the South Suburban Bill appeared in Committee, in the manner that it ultimately was for London. In regard to the Tottenham measure, it will not only provide for the works scheme foreshadowed by Mr. Corbet Woodall at the last meeting of the Company, but it will contain requests for authority to reduce the illuminating power, and to manufacture and supply power gas, and for relief from penalty for sulphur impurities other than sulphuretted hydrogen. It will be observed from the notices that a large number of other Companies—including Cheltenham, Cardiff, and Peterborough—will be seeking permission to reduce the illuminating power of their gas. The abrogation of the sulphur clauses will take a prominent place. In addition to the measure promoted by the co-operation of the Gas Companies' Protection Association and several Gas Companies, there will be other concerns—certainly half-a-dozen or more—who will, in Bills to be introduced by themselves for other purposes, ask for the relief. If they all succeed, the undertakings under the clauses will then be reduced to somewhere about twenty. A notice appears in this connection from the Wandsworth and Putney Gas Company; and they are also included among the promoters of the Joint Bill. Reference has been made to the power-gas supply proposals of the Tottenham Company; and notice has been given of a combined electricity and power-gas scheme for Cumberland. Touching the question of power gas, the Ossett Corporation are apparently (one of their proposals indicate) disinclined to give a supply of gas to be used merely as a stand-by by consumers having a private motive power service; and in a Board of Trade Order, the Mirfield Gas Company are also going to ask for exemption from liability to supply gas for motive power—probably on similar grounds. Several Companies will be seeking permissive powers in respect of bulk supply.

There is to be a recrudescence of the question of gas-works purchase next session. Certain Local Authorities have evidently got over the fright which the substantial purchase terms to expropriated companies of a time ago gave them. Pontefract, Aberystwyth, Hitchin, Newquay, Weston-super-Mare, and Wolstanton are noticed. Precedent justifies the belief that, where the right of purchase is not in existence, or where agreements are not made, there will be, among this group, severe contests and disappointed promoters. The Bury Corporation will again be at Westminster asking for powers to purchase the portion of the district of the Radcliffe and Pilkington Gas Company within the Corporation administrative area; and the Thornton District Council will also be seeking to acquire part of the Poulton-le-Fylde gas undertaking. Manchester is likewise making provision for the price to be paid to the Stretford Gas Company for relinquishing their rights and privileges in Chorlton-cum-Hardy. The Brixham and Crediton Gas Companies are both applying for, among other things, electric lighting powers; and it is curious that in both Bills provisions will appear respecting purchase of both the gas and electric lighting undertakings by the respective Local Authorities. It is also observed that several Companies foreshadow an enlargement of their concerns by the purchase of small neighbouring undertakings—notably Derby, Cardiff, Watford, and Uxbridge; while the Mid-Oxfordshire Company are proposing the consolidation by purchase of a number of small undertakings. Allusion has already been made to gas undertakings intending to apply for electric lighting powers; and power to make application for Electric Lighting Orders will appear in other Bills. Electricity, by the way, more especially in regard to London, will claim a considerable share of attention again this year, as will be seen by our "Electric Lighting Memoranda." It does not appear from the notice of the Administrative County of London Electric Supply Company that they are contemplating interfering with the South Metropolitan Gas Company on their East Greenwich land; but it is rather significant that the latter Company are proposing to ask Parliament for certain land powers, part of which land is "reputed to have been de-"mised by the Ecclesiastical Commissioners to Messrs. "Redpath, Brown, and Co., Limited." The contests between this firm and the Gas Company and the Administrative Electric Supply Company in recent sessions will be called to mind by the publication of this notice. It is interesting to remark, in view of our recent article on "A Public "Lighting Condition and Power Supply," that the Derby Gas Company and the Sutton, Southcoates, and Drypool Gas Company will endeavour to have amended the sections of their old Acts applying to the price of gas to the public lamps. From the mere outline which the notices give us of the parliamentary programme for the session, it is clear that interest will not be lacking.

Mr. Thomas Newbigging on the Price of Gas to Possible Users of Suction-Gas Plant.

EVER welcome, an enthusiastic reception was given to the veteran "guide, philosopher, and friend" of the gas engineer and manager—Mr. Thomas Newbigging—when he came before the members of the Manchester Institution of Gas Engineers on Saturday, with all his old vigorous style in controversy, to lay bare what he describes as the fallacy of allowing excessive discounts to possible users of suction gas and others. Mr. Newbigging would be the last to allow the great respect in which he is held to be an obstacle to free discussion from any view contrary to that which he takes of any matter of policy affecting the gas business; and of this we would suggest that those many gas engineers who have made considerable reductions in price for power purposes in competition with suction-gas plant should make note, if they have anything to advance in justification of the step they have taken. There are "old fallacies;" and there are new conditions. And it sometimes happens that the new conditions convert to a sounder state the constituent elements of the former fallacy. Prior to the present position of the electrical industry in the matter of prices, prior to producer gas, and prior to the ingenious suction-gas plant, the gas industry occupied an altogether different position from that which they hold now; and the fresh and potent conditions have to-day to be taken into strict calculation. Every gas undertaking is not so circumstanced that it can translate itself into the position of Widnes, Sheffield, and a few other places notably favoured in the matter of low price, so that it can afford to meet all kinds of competition with close prices for various purposes; and such undertakings have therefore to consider their whole circumstances, and find out at what prices they can afford to sell to large consumers for power, so as not to injure, but rather protect, the interests of those of their ordinary customers who, in comparison, are small consumers. That is the starting-point.

On whichever side a man may now find himself ranged—whether a discount man for large consumptions, or an oppositionist to any special privilege for large consumers, he will find something in this disquisition by Mr. Newbigging with which he can agree. Mr. Newbigging writes against the unwisdom of allowing excessive discounts; he grants that, for a large consumption, a reduction of price is allowable, and justifiable to a reasonable extent; and he urges that the aim should be not to compete with the suction-gas plant by selling the present high illuminating power gas at a loss, merely for the sake of gaining or retaining business, but to produce a gas that can be sold at a competition price, and yet yield the full profit on the sale. With all of which we fully agree. But examination must be made, and weight given to all these things in the light of present conditions; and not in the light of the conditions of the past. In the first place, what does the author intend to convey by the expression "excessive" discounts? "Excessive" is an abstract term which requires a concrete example to arrive at the intended meaning. What one man may regard as "excessive," another may only consider reasonable under the circumstances. We get some inkling as to Mr. Newbigging's meaning when he defines a reasonable reduction as one which will equal the cost of collection, a possible reduced leakage, the lessened risk of bad debts, a slightly less capital outlay for service-pipes, and an item for reduced maintenance. That is giving to the considerable consumer the minimum valuation for his custom; but, even so, on what basis are all these things to be determined that Mr. Newbigging would concede to him? The large consumer (say) of a few million cubic feet per annum gives no more trouble in the matter of collection than one small consumer, and more often not so much. Is he therefore to receive credit in calculating the concession to be made to him for all the collection costs of the number of small consumers, less one, who will represent by their aggregate the equivalent consumption of the single user of millions? Much the same inquiry would apply to the rest of the terms on which Mr. Newbigging is of opinion the maximum of benevolence should rest in considering the value of the large consumers' custom. There is an indefiniteness about it all which does not permit of a very clear insight into what Mr. Newbigging would himself really do if he were faced with the duty of settling a price for a considerable consumption through one service-pipe, which price would determine the gain or the loss of that consumer—the loss perhaps being to the detriment of the ordinary consumers.

This is a question that must be looked at both from the points of view of the large consumer and of the small consumer. It is not the concern of the large consumer that the costs of supplying the small consumer are greater per 1000 cubic feet than the costs per 1000 cubic feet of supplying him in bulk; but it is very much the concern of the small consumer that the custom of large consumers should be obtained at a price that will pay the charges of production, *plus* a small profit per 1000 cubic feet, which small profit in the total will amount to a substantial sum, and which substantial sum in turn will go towards assisting to pay the charges on the capital spent to meet the requirements of the ordinary class of consumer. It is unfair, where large and small consumers are concerned, to average the capital charges per 1000 cubic feet of gas sold, and apply the average equally to both the large and the small consumers; for without the consumption (which yields a material profit on the volume of the business) of the large customers—particularly the consumers of power gas by day—the capital charges per 1000 cubic feet for the small consumers must be proportionately heavier. Excepting undertakings favourably circumstanced to an extraordinary degree, and excepting also undertakings that, through unfortunate management and happenings in the past, have an undue financial weight to carry, do we not find numerous illustrations supporting this contention, by contrasting the small business of small undertakings and the large business of large undertakings? Almost invariably the larger supply cheaper than the smaller! Why? Owing mainly to the fact that both the costs of production and the charges beyond, per 1000 cubic feet of gas sold, are less, on account of the larger business done. We may apply this line of reasoning to the big consumer—especially the consumer using in bulk in the day time—and hold that it is to the advantage of the small and intermittent consumer that his custom should be retained even at the sacrifice of a part, not all, of the average of the capital charges per 1000 cubic feet. For the addition of his large consumption must contribute to the reducing of costs generally; and that is to the benefit of the small consumer. The largeness, as a rule, of the profit in the total derived from the former consumer also advantages the ordinary consumer in supplying a part of the profits required for capital purposes. The law of averages cannot be stubbornly applied to business so dissimilar as large and small consumptions. If there are not advantages in having large business besides those for which Mr. Newbigging would give the individual power consumer making considerable demand some allowance, then we have yet to have explained to us how it is that progressive gas undertakings, as their output of gas increases, are able to make reductions in price all round, even with material at higher figures than have obtained in years well in memory when gas was selling at higher prices; and for his greater contribution to that increased output, the large power consumer surely deserves more consideration than the ordinary, intermittent one.

Mr. Newbigging speaks as though every individual consumer produces this condition proportionately; but, as a matter of fact, they do nothing of the kind. We are entirely opposed to supplying anyone at a "loss," but certainly in favour of supplying special consumers at a price that will mitigate costs, and tend to reduce the ordinary consumers' charges. Business with those special consumers of the industrial class is not to be obtained, nor retained, by a slight reduction, even with the subsidiary advantages of town's gas thrown in. Of that responsible gas engineers and managers have been made painfully aware. In such matters as this, it is no use inverting the existing order of things, as Mr. Newbigging does in one part of his paper, to see on whom would then devolve the "fixed charges." We must take the conditions as they are; and as these conditions are, it is to the gain of the night and light consumers (the majority of whom only consume a modest number of thousands of cubic feet in the course of the year) to retain the large business of the day industrial consumer. Moreover, these day consumers are also consumers of gas for lighting; and for that purpose, as a rule, they pay higher prices than for power consumption. If there is loss of the business in power, there may also be loss of the business in lighting. The customers of the electrical power companies supplying at ¾d. and 1d. per unit for industrial purposes have the statutory right to

use 20 per cent. of their consumption for lighting. Manufacturers do not overlook this consideration.

There is yet the point as to producing a lower illuminating power gas that can be sold at competition price; but Mr. Newbigging himself advances two reasons why the production of such a gas is not immediately universally possible—the restrictions as to illuminating power have to be abolished, and the use of the incandescent burner is not general. His aim is the one we advocate; but there is the period between now and the accomplishment of that aim. Conjoined with the statement of the aim, Mr. Newbigging advances what is evident to all—that things have not come to such a pass that, "while the grass is growing, the horse is starving." But, speaking of horses, another aphorism comes to mind, which gives us warning that it is somewhat foolish and negligent not to lock the stable-door before the horse is stolen. And until the time comes when the lower illuminating quality of gas can be produced, Mr. Newbigging would handicap town gas, and give the competitors all the opportunity possible for snatching custom from the gas undertakings and for securing new power business, and then the days of a general lower illuminating power gas will find the competitors already well established. Gas engineers generally are not going to lose the business so tamely as Mr. Newbigging would have them. We fully believe that healthy competition is good; but it is not healthy competition when it is unequal, and made unequal by temporary restriction and devotion to a doctrine that had its genesis in other days. We are against excessive reductions; but ideas as to what are excessive reductions are clearly at variance.

The discussion evoked by the paper was an extremely good one, and, in the main, was clearly favourable to a generous treatment of the power consumer, without creating actual loss—most of the speakers showing that they were able to grant the former without effecting the latter. In the course of the debate, the valuable address delivered by the President—Mr. S. Meunier—in February last, was frequently brought into prominence.

With regard to other parts of the programme, time did not allow of a discussion on the "Question-Box" or on Mr. Kendrick's paper on "A New Purifier Grid and Purifying "Materials." These expected contributions were taken as read, and their discussion postponed. Certain alterations were made in the rules; Mr. W. Prince was deputed to succeed Mr. J. H. Brearley as District Representative on the Council of the Institution of Gas Engineers; and the last-named gentleman was appointed to follow Mr. Meunier in the presidential chair of the Manchester Institution. The Senior Vice-President is to be Mr. Prince; and the Junior Vice-President, Mr. J. Timmins. The members had a most cordial welcome to Stockport from the Chairman and the members of the Gas Committee and the President.

Taxation and a Suggestion.

THE burden of taxation has increased, is increasing, and ought to be diminished. Such is the cry which is heard on all sides, though without any, or but the faintest, suggestion for a remedy. "Ignorant impatience of taxation"—to adopt a phrase of Lord Beaconsfield's—has been a characteristic of all periods; but the description is ungenerous, seeing that the public has never grudged expenditure for necessary service, whether national or local. What it does grudge is wasteful expenditure such as has been shown by recent revelations occurred during and immediately after the Boer war, or such as that which is being incurred by the London County Council at the present time in the maintenance of an unappreciated steamboat service. For the prevention of both the one and the other is required a greater degree of vigour in the national and municipal life—of vigour that shall display itself at the polls for the purpose of returning representatives pledged to efficiency and economy. Our national burdens have increased nearly 40 per cent. compared with those of the period immediately preceding the Boer war, and who is there can say with confidence that the enormous additional expenditure which this represents—somewhere about 30 millions sterling per annum—is fully compensated for by additional security and efficiency of the national services. Small wonder is it that while our export trade is improving, almost by leaps and bounds—home trade still languishes. The people have so much less to spend now than they had formerly. But, highly important though this subject of national expenditure and taxation be, in its bearing upon the welfare of the community, it has attracted far less attention than that of local taxation, which, to the fullest extent to which it is levied, appeals directly to the pockets of every ratepayer. Indirect taxation may be and often is, in the highest degree, injurious to the welfare and industry of a nation, but is borne more cheerfully than direct taxation, for a velvet glove conceals the iron hand. Thus it is that local taxation, which is mostly direct, albeit for services to the community which are invaluable for the preservation of health and comfort, comes in for perhaps more than its full share of criticism. None the less is it desirable that its burden should be diminished or kept down as far as practicable; and especially is it desirable that the business portion of the community should have the largest measure of relief to which it is entitled.

The mode of assessment is a subject of increasing importance, and ought to engage the attention of the Legislature in the near future. In the meantime, attention may usefully be given to such inequalities as at present exist, while the forthcoming quinquennial reassessment affords an opportunity for all connected with gas undertakings to obtain redress for over-valuations. Now is the time to put to the test the reality of the grounds for any disbelief that may exist as to the equity of present assessments. Why should there not be an Association of Gas Undertakings to watch over this question of rates? It is to be noticed that the Railway Companies are waking up to the conviction that they are over-assessed. Why this should be, having regard to the credit these bodies enjoy for astuteness in the management of their affairs, it is difficult to understand; but a recent writer in the "Standard" estimates the total amount of over-assessment at £2,000,000. It is alleged that this result has been brought about by the action of the Companies' rating surveyors in persistently ignoring the principle of *cumulo* valuation, by the operation of which the total rating value of an undertaking is proportioned among different parishes in which its operations are carried on. Instead of this, and in disregard of the ruling of Mr. Justice Wightman in *Reg. v. West Middlesex Water-Works* in 1859, separate and independent assessments have been made and agreed to for each portion of a railway according to the parish in which it is situated. Whatever difficulties there may be in applying the *cumulo* principle to the valuation of a railway undertaking, its application to that of a gas undertaking is a comparatively simple matter, and involves complication in but a very few cases, nor has it, so far as is known, been ever departed from. That it is a safeguard against over-assessment must be evident from the experience of the railway companies, but fortunately there is no need at the present day to impress upon gas undertakings the importance of adherence to it.

Other matters there are which claim attention; but legislation is needed to carry them into effect. There are, notably, the questions of representation by joint-stock companies (who may be the largest ratepayers), and differential rating which seem to be ripe for settlement. As regards the latter, we commented not long ago upon a decision of the Privy Council which exempts the distributing-mains of the Melbourne Gas Company from equal rating for sewer purposes with property deriving direct benefit from sewerage operations. This is a distinct recognition of the principle of differential rating which ought not to be lost upon the representatives of the gas industry in this country. It is true that general legislation is at present at a standstill; nor is anything of importance likely to be effected during the lifetime of the present Parliament. But this state of things cannot last. Sooner or later, the Legislature will have recovered its normal activity. In the meantime, why should not the Gas Companies' Protection Association, or the Institution of Gas Engineers, take the matter in hand, with or without the co-operation of other industries affected, with the object of securing an amendment of the law?

Gas for Power at Birmingham.

It seems that there is a prospect of consumers of gas for power purposes in Birmingham gaining some concession as a result of the agitation which has recently been going on with regard to the price charged. It will be remembered that the discussion of the question arose some two months ago, when the Directors of a Cycle Company having works in the city called the attention of the shareholders, in their annual report, to the rate they had to pay for gas used in manufacturing operations—

1s. 10d. per 1000 cubic feet, less 5 per cent. discount. In view of this charge, the opinion was expressed that it would be advisable for them to put down a private gas plant; and at the subsequent meeting of the Company, the Chairman (Mr. J. J. B. Arter) devoted a considerable amount of attention to the subject. He admitted that from the gas profits they received certain relief in their rates; but the amount they contributed to the profits with their gas consumption (something like £200 a year) was out of all proportion to the benefit obtained in this way. He maintained—as many have done before him—that the best plan was for every concern to pay for its rates under the head of rates, and to pay for its gas as gas. Rather than that the cost of gas should be reduced in the course of a few years (after the manufacturers had spent perhaps two or three hundred thousand pounds in putting down plant), he thought it would be much better if this were done now, so that they could enjoy the benefit of it without having to force the hands of the Corporation by putting down plant to compete with them. A lengthy correspondence in the local Press followed; and now comes the statement that the Gas Committee have decided to recommend the Council, at their meeting next week, to hold out some further inducement to large users of motive power to become, or remain, customers of the Gas Department. At present there is only the one charge of 1s. 10d. per 1000 cubic feet for gas used for driving engines, irrespective of consumption; and the Committee's proposition is that, after the Christmas index-reading, users of over 100,000 cubic feet of gas per quarter exclusively for motive power purposes shall be charged 1s. 7d. per 1000 cubic feet, less the usual discount of 5 per cent. for prompt payment—the price for smaller quantities to remain as now. It is to be noted that the amount of gas named as the minimum to entitle customers to the lower rate, must be consumed in one premises. We do not know what proportion of the users of gas for engines take more than 100,000 cubic feet per quarter; but there are doubtless a considerable number of these consumers, seeing that the quantity of gas supplied by the department for power is something like 960 million cubic feet per annum, or about 15 per cent. of the total amount sold for the twelve months to last March. By these large customers the concession (if it is agreed to by the Council) will be welcomed; and perhaps it may be the means of inducing, not only the Cycle Company already referred to, but others also, to remain faithful to the Corporation Gas Department.

The Ashton Gas Company's Income-Tax Appeal.

When an individual conscientiously believes that he has been for years taking a right course in some particular matter, he is justified in continuing in it until he has been proved to have been in the wrong. Similarly, when a company have been in the habit of interpreting a legislative enactment in a certain way—doubtless as the result of professional advice—they are to be commended if they do not rest satisfied with one judicial pronouncement against them, especially as even judges "learned in the law" not unfrequently testify to the truth of Macaulay's dictum that "minds differ as rivers differ." Indeed, an example of this was afforded in the Canadian case reported in the "JOURNAL" only last week. To-day, however, in the report of the proceedings before the House of Lords in the Ashton Gas Company's income-tax appeal, taken in conjunction with those in the two Courts immediately below, there is shown a unanimity which, however disappointing it may be to the appellants, cannot be regarded otherwise than as evidence of a clear understanding of the terms of an Act of Parliament. There is no "uncertain sound" about all the decisions; for they have been against the Company all along the line. The point in dispute was whether they were right in paying their statutory dividend free of income-tax. Mr. Justice Buckley said they were not, for the reason that by doing so they were exceeding their authorized dividend by the amount of the tax. Before the Court of Appeal, a no less able advocate than Mr. Haldane failed to convince their Lordships to the contrary; and they dismissed the Company's case without even troubling to hear the other side. In the House of Lords, Mr. Terrell was no more successful than his learned predecessor. The Lord Chancellor put the matter very plainly. He said the Legislature had enacted that the shareholders should not receive more than 10 per cent. as profit on the undertaking. If the Company paid them 10 per cent., and then made them a further allowance equivalent to the income-tax, could it be contended that they would not be paying a dividend in excess of their statutory powers? He thought that to do so would be to alter the real nature of "profit," which was what was earned after paying all the expenses necessary and incident to the earning of it. The thing taxed was profit, and the income-tax was a charge on profit. His Lordship shared with Mr. Justice Buckley the difficulty of understanding how so plain a matter could have been discussed at such length. After the decision of the highest tribunal in the land, the "flutter" which Mr. Haldane told the Court of Appeal had been caused by Mr. Justice Buckley's judgment among the companies who had been paying their dividends free of income-tax, will probably give place to a settled determination to acquiesce in their Lordships' ruling.

Electric Lighting and Ventilation at Caxton Hall.

Those among gas engineers who visit Caxton Hall, and find it impossible to make head or tail of the proceedings on the draft regulations for locomotives and waggons on lines and sidings under the Factory Act, can find occupation for the mind by considering the lighting and ventilating arrangements of the hall, and devise ready means whereby the authorities could get about thrice the present illumination by properly utilizing the gas that is at present expended for ventilation alone. The hall is illuminated by 64 16-candle incandescent electric lamps, arranged in fours on 16 pendants. Therefore we may take it that something like four units of electricity per hour are being consumed for lighting the hall. In two positions in the ceiling, there are ventilating-shafts with large bell-mouthed openings, under each of which some ten flat-flame burners are flaring away—judging by their appearance—at the rate of 8 cubic feet each per hour. The electricians cry aloud about the vitiated atmosphere where gas is used, and scorn the idea of stagnant air where electricity is employed. Problem No. 1 then is why, with electricity in use, are those two ventilating-shafts required in Caxton Hall, with gas burning underneath to cause an up-draught? The only solution we can find is the stagnant-air one. Regarding problem No. 2 as to how the gas could be better utilized. We have seen that there are in use 64 16-candle power electric lamps; and giving these credit for their full nominal illuminating power, we have a total illumination in the hall equal to 1024 candles, though it runs against the sensitive conscience to write it. Then for ventilation purposes, we have twenty gas-burners going, consuming at least 8 cubic feet each—that is to say, 160 cubic feet together. Taking Mr. James Swinburne's recent statement, which has had widespread confirmation, that an illuminating power of 18 candles per cubic foot per hour is obtainable by the aid of ordinary incandescent gas-burners, we find that the gas which is being used for ventilation purposes alone would be capable of developing, given incandescent burners for its consumption, 2880 candles. So that quite 1800 candles more illumination could be obtained in the hall than at present, the expense of the electric light be saved, and the ventilation go on as usual by the adoption of rational and simple means of making the gas combine the double duty. In this is the solution to the second problem. It is waste to use gas for a single purpose, when it can efficiently perform the double one. The gas that is being consumed solely for ventilation contains the energy necessary for the production of light equal to 2880 candles, without going to the higher power obtainable by special means. Why are the authorities at Caxton Hall losing that light, and paying for electricity?

Propping up a Municipal Electricity Works.

The desperate position to which some municipal electricity undertakings are reduced was strikingly illustrated by a discussion which took place at a meeting of the Worcester City Council last week. Ever since they were established, the Worcester electricity works have been a "white elephant." Instead of earning profit, they have been a burden on the rates; while their existence is no doubt largely responsible for the fact that, except in two or three principal thoroughfares, the streets are miserably lighted. When electric tramways were laid in the city, it was hoped that the electricity works would be put upon a better footing; but disappointment has again been experienced. The Tramway Company's demand has fallen far short of the sanguine anticipations of the Corporation, with the result that a large proportion

of the new plant laid down to furnish power to the trams is lying idle. The consequence is that the position of the Committee, which was previously serious, is now almost desperate. In casting about for new sources of revenue, they have offered to supply current to the Water and Sewage Committee, for driving the pumps, at the low price of ¾d. per unit. At present, the Committee have in use two 100 and one 80 horse power gas-engines. The Electricity Committee propose that two electric motors of 35 and 40 horse power respectively be substituted for the 80-horse power gas-engine. According to a calculation by the City Engineer, gas costs £410 per annum; while the Electrical Engineer worked out the cost of gas at £600. Electricity, it is admitted, will cost £815, even if supplied at ¾d. per unit. By some method of calculation which we do not profess to understand, the Water and Sewage Committee convinced themselves that if electric power was adopted, "the biggest loss that would accrue to the ratepayers per year would be £100." Some of the councillors rather jibbed at these figures; and one pertinently asked how the Electricity Committee, who were reported last year to have made a loss of 1d. per unit, are going to supply current at ¾d. Still the recommendation was adopted. An indirect subsidy of this kind is much more pleasant for a municipal electricity works than a direct payment out of the rates. It amounts to the same thing; but it does not figure so conspicuously and glaringly in the accounts, and this is no small merit in the keeping of the accounts of municipal electricity undertakings.

Is a Municipal Workshop a Factory?

It has fallen to the lot of Mr. Lane, at the West London Police Court, to have to answer an interesting conundrum, arising out of an accident to a workman in the employ of the Kensington Borough Council through a planing-machine in the Council's workshop being unfenced. A summons was taken out against the Council, by the Inspector under the Factory Acts, in respect of the unprotected machinery; and for the recovery of penalties it was necessary to prove that the workshop was a factory within the meaning of these Acts. Whether it was so or not was the riddle which, with the aid of Counsel, Mr. Lane had to solve. The prosecution contended that the workshop was a factory (1) because machinery labour, exercised "by way of trade or for purposes of gain," was carried on there; and (2) because certain metal manufacture—the bending and drilling of iron bars into tyres for the Council's carts—was executed on the premises. Counsel in support of the summons further argued that an element of barter was not necessary to "gain," and that trade might be carried on without any idea of "profit." To this the Magistrate aptly retorted that "there might be angels in the world;" and he felt himself unable to hold that the place was a factory on the basis of trade or gain. There still, however, remained the second point—whether the transforming of iron bars into tyres constituted "manufacture;" and on this the prosecution succeeded. Mr. Lane held that, inasmuch as the bending and drilling made of the iron bars a different article from what they were before, this constituted a manufacturing operation, and consequently the place where it was carried on was a factory; quoting as an analogous case the "parts" which were put together in the making of a watch. We are not surprised that, in giving his decision, he should have observed that the point raised was about as nice and as near the border-line as any argument could well be; and it would be interesting to see it further discussed. But besides its curious side, the case is not without importance to other municipalities as well as to the Kensington Borough Council; and from this point of view also it would be satisfactory to obtain the opinion of a Higher Court upon it. Mr. Lane, in view of the intricate character of the question, expressed his willingness to state a case; but we do not know whether the Council have decided to avail themselves of this offer. Perhaps for this occasion they may elect to allow the matter to remain where it is. The fine inflicted was a merely nominal one—twenty shillings—and no costs were granted to the prosecution, because the evidence submitted to show the danger of the machine, and what sort of guard should have been provided, was of so meagre a character that it did not afford any real assistance to the Magistrate in the elucidation of this part of the case.

REMOVAL OF NAPHTHALENE FROM COAL GAS.

By Dr. H. G. Colman.

[Second Article.]

The second argument adduced by Messrs. White and Clary in support of the hypothesis that hot tar removes naphthalene more completely from gas than cold tar, is found in the results of the experimental determination of the naphthalene in the crude gas at various points during its passage through the condensing system. Such crude gas contains the naphthalene in two conditions—viz., (1) dissolved in the tar-fog mechanically carried with the gas, and (2) that present as vapour in the gas itself. In order to ascertain the amount that was present in each form, the authors aspirated a sample of gas through a filter of asbestos and glass wool, to remove the mechanically suspended tar; the tube containing the filter being (with certain exceptions referred to later on) placed inside the main, in order to keep it at the same temperature as the gas, and thus avoid disturbing the equilibrium between the gas and tar. The filtered gas was then passed through picric acid solution, to absorb the naphthalene present as vapour; the amount in the tar filter and picric acid solution being then estimated separately.

Before any conclusions can be safely drawn from such experiments, it must be proved that the experimental method adopted does really give correctly the relative amounts of naphthalene in the tar and gas in the main from which the sample is drawn, and that the filter does not effect the removal of any naphthalene really present as vapour. During the past few years, I have made many attempts to determine the amount of naphthalene truly present as vapour in hot crude coal gas, by filtering off the suspended tar in the manner employed by Messrs. White and Clary, but have been compelled to conclude that the tar-filter, even when placed inside the main, does disturb the equilibrium, and brings about the absorption of some of the naphthalene actually present in the gas as vapour. Such absorption appears to be due, in part at any rate, simply to surface condensation of the vapours present, on the relatively very large surface of the asbestos and glass wool, in spite of the fact that this is maintained at the same temperature as the gas. If, on completing a test, the filter is removed from the main, the first portion is found to be black with separated tar; but the remainder is still quite clean, as the tar has been completely removed before the gas reaches this portion. Nevertheless, this undiscoloured portion contains absorbed naphthalene and other vapours; and if this part be detached and placed in a heated tube through which air is passing, the presence of naphthalene can be detected by passing the air through a solution of picric acid. That such surface condensation should take place on the filter is not in itself at all surprising, as a similar effect of large surface has been frequently observed. For example, Bunsen showed many years ago ("Annalen der Physik," XX., 545; XXII., 145; XXIV., 321; XXIX., 161) that glass wool at the ordinary temperature condenses a film of carbonic acid on its surface, though the boiling-point of carbonic acid itself at atmospheric pressure is 78° – C., while in the case of coal gas the vapours present have boiling-points at atmospheric pressure far higher than that of the filter in these experiments.

On this account, therefore, I have been compelled, with great regret, to disregard all the naphthalene tests I have made in which the gas, previous to analysis, passes through a filter having a large surface area, inasmuch as this introduces an error of unknown magnitude, but always in the direction of bringing out the result too low. The same criticism applies to the results obtained by Messrs. White and Clary under similar conditions. These tests, though they probably give a fairly correct result for the total quantity of naphthalene in the crude gas, do not furnish its correct proportional division between the tar-fog and the gas proper; the former value being too high, and the latter too low. Under these circumstances, all conclusions from such tests as to the effect of hot tar on naphthalene removal, or as to the relative saturation of the gas at the various points in the condensing system lose their validity.

The tests made with the gas from the stand-pipe (ascension-pipe) at different works require separate consideration, inasmuch as in these cases special conditions occur. In making them, the tube containing the tar-filter was placed partly outside the main, and was therefore exposed to the temperature of the retort-house atmosphere. The reason for this procedure is given by the authors (Appendix II.) as follows: "When the tube was placed inside the pipe, it was found that a good deal of tar and oil passed the filter uncondensed to the picric acid bulb tube." But this tar and oil which passes the filter uncondensed (and which would undoubtedly contain naphthalene), must have been present in the stand-pipe *as vapour;* for otherwise it could not have passed through the filter, and the naphthalene in these ought therefore to be included in that part of the testing apparatus collecting the naphthalene present as vapour. Instead of this, part of the filter was placed outside the pipe; and these vapours condensed there, and were soaked up by the cool portion of the filter, and eventually reckoned as naphthalene in the tar. While, therefore, these stand-pipe experiments give interesting and important information as to the amounts of tar and of naphthalene formed at different periods during the carbonization of the coal in the retort, they are value-

less for furnishing any idea of the relative quantity of naphthalene present as vapour in the gas in the stand-pipe; and the authors' conclusions as to the remarkable absorptive power of tar at this point are unjustified. That such condensation of vapours did take place in the filter, is shown by the fact that the tar there separated contained much water; while the gas in the pipe, having a temperature of about 300° Fahr. could not possibly contain any condensed water.

To sum up, therefore, it appears to me there is no justification for Messrs. White and Clary's hypothesis that hot tar absorbs naphthalene from coal gas more completely than cold tar, but that this is contradicted by many known facts, and is not really borne out by their own experiments. Further, the method they adopted for estimating naphthalene in the crude gas containing suspended tar, while fairly accurate as regards the total amount present, does not permit of a correct determination of the relative amounts present in the tar-fog and in the gas proper—the latter figure being lower than the amount actually present.

I have made many attempts to obtain a reasonably simple method of determining with fair accuracy the amount of naphthalene present as vapour in hot crude gas, but so far without success. At present, I am endeavouring to get an approximate idea of the quantity in an indirect manner—namely, by separating off mechanically a fair quantity of the tar-fog from the hot gas, and then taking this tar, heating it to the temperature of the gas at the point where it was separated, passing through it a current of gas free from naphthalene at such a rate that the latter is finally in complete equilibrium with the tar, and determining the quantity of naphthalene in the resulting gas. The figure thus obtained should represent with approximate accuracy the condition of the gas with which the tar-fog was in equilibrium when the latter was separated from it.

Although, as stated above, I am unable to agree with the authors that scrubbing with hot tar effects a more complete removal of naphthalene from gas than when cold tar is employed, I do not wish it to be inferred that scrubbing with hot tar may not eventually be beneficial by altering the composition of the vapours present in the hot gas in such a manner that, in the subsequent cooling in the condensers, a better elimination of naphthalene will be effected. Whether this will be so, must depend upon the composition of the tar and of the vapours in the gas at the point of treatment. If this is such that the result of scrubbing is to decrease the naphthalene content of the gas, or to increase the amount in it of vapours other than naphthalene, the result will be beneficial; or even if the quantity of naphthalene in the gas is increased and simultaneously the quantity of other condensable vapours increased in greater proportion than the naphthalene, benefit will still be obtained. If, however, the tar employed is such that naphthalene is added to the gas without simultaneously increasing the proportion of other condensable vapours, the subsequent separation of naphthalene in the condensers will be made the more difficult. Thus, for example, in the case of ordinary coal-tars, that from Midland and South Yorkshire coals was found to be beneficial by Mr. J. F. Bell, at Derby, while with the tars from Newcastle and Durham coals (which contain more naphthalene and less light oils) I have found no benefit, but, if anything, the reverse. Messrs. Young and S. & T. Glover, in one of their methods of naphthalene extraction, also practically adopt the plan of scrubbing with hot tar—this tar being specially manufactured by carbonizing a small proportion of cannel at low temperatures, and mixing the hot gas evolved, together with its suspended tar-fog, with the main stream of coal gas, after this has been partly condensed. Such low-temperature cannel tar is poor in naphthalene, and rich in light and middle oils (other than naphthalene). Consequently, it exerts a very favourable influence in the subsequent removal of naphthalene.

Where a works makes carburetted water gas as well as coal gas, I believe much advantage would probably be gained from washing with the hot oil-tar, which, as usually made, is also relatively poor in naphthalene and rich in light and middle oils. This might be carried out by separating the coal-tar fog mechanically from the hot gas, and then introducing in place of it a spray of oil-tar sufficiently fine to be carried in considerable quantity with the gas through the subsequent condensing system.

In a further article, I propose to consider the valuable suggestions made by Messrs. White and Clary with regard to the influence of phenols in the elimination of naphthalene.

The Largest Gasholder on the Continent.

The interesting description (translated from the "Journal für Gasbeleuchtung," and published last week) of some of the constructional work connected with the new gasholder at the Mariendorf Gas-Works of the Imperial Continental Gas Association was incomplete in one particular. The publication has brought to knowledge that this holder was practically the last considerable piece of designing work that Mr. Corbet Woodall did for the Association before he exchanged the post of Consulting Engineer for that of Director. In view of the fact that this is the largest holder yet erected on the Continent—having a capacity of over 5¼ million cubic feet—there is interest, if only from the historical point of view, in placing on record the name of the designer.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 632.)

THERE was some improvement in the general tone of the Stock Exchange last week, although not free from fluctuations. The more reassuring aspect of Russian affairs was a distinct relief; and the money outlook was promising. These factors produced some buoyancy; and Consols and other gilt-edged securities felt its influence. But, later on, the political position, and the uncertainty regarding a dissolution of Parliament, had a disquieting effect, which, coupled with a normal amount of realizing profits, pulled things down at the end of the week. In the Money Market there was a good demand at first, which maintained firm rates for short loans; but it eased away towards the close. Discount was firm on the whole, though sometimes uneven. In the Gas Market, there was a degree of activity unparalleled for a long while—principally in the stock of one Company further referred to below. But stocks throughout the list were freely dealt in; and the tendency was all in favour of higher prices. Many quotations advanced, and some of them largely. In Gaslight and Coke issues, the ordinary was moderately active and quite firm. Dealings were at 100¾ on Monday, from which figures they advanced to 102 on Friday, with a corresponding leap in the quotation. In the secured issues, the maximum changed hands at from 90 to 91; the preference from 111½ to 113; the debenture at 88. South Metropolitan was rather quieter than in the previous week, but equally strong. On Monday, 131½ was marked; but this price was soon left behind, and business later on was repeatedly done at 133½—the quotation rising a point. The debenture stock was done at 88 and 88½. Commercials were almost wholly neglected; one bargain in the 4 per cent. at 117¼ being all that was marked. The Suburban and Provincial group was just as quiet as usual. Bournemouth "A" marked 29¾; and ditto "B" 17¼. British changed hands at 42⅜ and 43¼; South Suburban ordinary at 124¼ and 125¾; and West Ham preference at 124½. The Continental Companies furnished the lion's share of the business done. It had leaked out before the close of the preceding week that the holders of Imperial Continental might expect to receive a "plum" in some shape or other, and the stock then began to rise. Last week the approaching bonus was more widely bruited, and a brisk demand was made for stock, which resulted in the quotation being advanced 14 points. From dealings at 221 on Monday, the price rose until 236 was marked twice on Friday. Union also was in favour; the ordinary marking from 127 to 130; the preference, 149 and 149½. European recovered its position in quotation; but the only mark was 22⅜ in the fully-paid. Tuscan was done at 10 and 10 1/16, and Malta at 4½. Among the undertakings of the remoter world, Bombay changed hands at from 6⅞ to 7, and Oriental at 152½. Cape Town ordinary marked from 17⅞ to 17⅜, ditto preference 10⅜, and Melbourne 5 per cent. 101¾. Buenos Ayres was done at 12½ and 12⅝, Primitiva ordinary at from 7⅛ to 7¼, ditto preference at 5 5/16, and ditto debenture at from 99 to 99¾. River Plate marked 12⅜, ditto debenture 97¾, and Monte Video 12 and 12¼.

The closing prices are shown in our Stock and Share List on page 632.

ELECTRIC LIGHTING MEMORANDA.

The Chaotic Condition of Affairs Electrical in London—The County Council and the Borough Councils—The Bulk and Power Bills for London and the Surrounding Country—Municipalities and Fitting Work—Mr. Pearce on Modern Electric Lamps—The Competition for Street Lighting.

THE electricity supply of London is again to monopolize a large amount of the attention of Parliament in the coming session, unless the Government take the course which prudence suggests, and have a general inquiry into the whole subject before granting any further powers. Opinion and existing and embryo schemes are in a chaotic state, and private and public suppliers of electricity in the Metropolitan area do not appear to know which of the many courses that are open before them is the right one to pursue for the protection of their statutory conferred rights and in the interests of the future of their undertakings. At the beginning of last session, they were groping in darkness, and they are to-day in no better case. Indeed, on the whole, their position has been made more obscure by the action of the London County Council in forcing forward an ill-considered, shapeless scheme, which has been shown to be financially unsound, and included in which are proposals which Parliament, it is safe to say, will not concede to the London County Council. Many thousands of pounds will be sunk over this measure, though it leaves Parliament in an inchoate state, and merely lands the Council (as is generally expected) in their *status quo*, which is a common experience for them in respect of their parliamentary action. Perhaps however, this promotion of the Council will assist in producing a full inquiry into the general question; and if it does that, it will certainly have served one good purpose. Meanwhile certain of the Borough Councils have, at the conference convened by the County Council, passed a resolution approving of the introduction by the Council of a Bill to enable them to supply in bulk, but

leaving at least two openings for the withdrawal of their support. The resolution has been passed subject to the interests of the Borough Councils' existing undertakings being safeguarded, and to the details of the measure being otherwise satisfactory. The Councils are hardly in a position to judge of these matters yet, for they have nothing before them but a skeleton project.

This provisional acceptance of the Council's scheme seems apparently to have upset a little the proposals made and endorsed at a prior conference of certain of the Borough Councils at the Great Eastern Hotel, when united action was agreed upon for enabling the Municipalities to give a bulk supply of electricity at their boundaries or outside their areas, either by the establishment of a joint bulk station or stations, or by linking up the existing sources of supply, or by both methods. Little has been heard of these propositions since, with the exception of incidental references to them at the meetings of the Councils, and notification of proposed legislation following the lines mentioned on the initiation of the boroughs of Stepney and Shoreditch. It is interesting, however, to find, by a little analysis, how far the County Council have carried the Borough Councils with them. There are in the Metropolitan area 28 Borough Councils; but Poplar and Chelsea were not present at the conference. Therefore, there were 26 authorities represented; but apparently six did not vote, seeing only fourteen votes were recorded in favour of the resolution, and six against it. And we make out, further, that half-a-dozen of the favourable votes represented Authorities who have not electrical undertakings of their own; and of those who were favourable, there were five who were present at the previous conference of Borough Councils. However, the County Council have only secured to themselves the support of half of the Metropolitan municipal bodies; so that the Council will not approach Parliament with the united mandate of London. They have now to exert themselves to save the adherence of those who voted in favour of the resolution with the double-barrelled reservation. Although the Borough Authorities are not unanimously paying allegiance to the County Council in respect of their Bulk Supply Bill, they are quite willing that the Council should make another essay at picking the free-wiring chestnut out of the fire for them. In view, therefore, of representations to them, the County Council are going to seek a third rebuff from Parliament in respect of this matter.

That there is going to be a repetition of the prolonged fight of last session cannot be doubted now that the notices of promotion have, in accordance with the Standing Orders, been published. The struggle for the electricity bulk and power supply of London has already broken out in several quarters. There is the Administrative Company's Bill, the County Council measure, and others which propose to give London the privilege of having its electricity generated at a distance, and brought to London by, in large measure, overhead lines. From the notice, it appears that the Administrative Company's scheme is identical with that with which they left Parliament last session, but there are, so far as we are able to judge from the wording of the notices, changes in respect of the land for the generating-stations. We can trace no reference to the land of the South Metropolitan Gas Company, nor to the Fulham land of the Gaslight and Coke Company. With regard to the limits of supply, it will be remembered that a large part of the western district of London was allocated last session for bulk and industrial purposes to the Metropolitan Company; and the Administrative Company had that section carved out from their proposed area. They are now asking for authority to supply in bulk and for manufacturing and industrial purposes in the cities of London and Westminster and in the areas of nineteen Borough Councils, as well as in extensive territories in Surrey, Essex, and Kent. The County Council, on the other hand, are asking for similar powers in the whole of the Administrative County of London, portions of Essex, Kent, Surrey, and Middlesex. But they must know that Parliament are not likely to entertain any abrogation of the powers they gave the Metropolitan Company last session, or to grant further competitive ones in that Company's area; nor is there any greater probability of the Council being accorded power to go outside their jurisdictive limits. For the former reason, one argument that this bulk and industrial supply should, by the Bill, be put into the hands alone of the central authority, must fail. It would be a nice state of things for private enterprise if it did not. The authority the Council desire is to supply electricity in bulk or otherwise to any local authority, company, body, or person, with statutory powers. Apart from territory, they are brazenly proposing a very fine trespass on the rights of the Metropolitan Company, as well as on those of other established concerns, from whom they receive large sums by way of rates. So that they are trying to get a double financial pull out of electricity in London. The land they are proposing to take for their generating-station is in Battersea; and it seems exceptionally well situated for the object in view, being bounded by the Chatham and Dover Railway, the Brighton and South-Coast Railway, and the River Thames.

No doubt the greatest novelty in the electricity applications to Parliament will be the Additional Electrical Power Supply (London) scheme. It is an ambitious proposal, and the notice regarding it occupies several pages of the "London Gazette." It is the scheme that contemplates the generation of electricity at St. Neots and the bringing of it to London largely by way of, or adjacent to, the Great Northern Railway, on overhead lines. The journey of the electricity to London it is proposed to break at Enfield (which is 40 miles distant from St. Neots), and thence the transmission will be by subterranean cables. It is estimated that the cost of the scheme, inclusive of 30 miles of distributors, will not exceed £2,000,00, which, taking the only means for comparison into consideration, appears to err on the side of modesty. It is stated also that coal will be obtained delivered in the Company's bunkers at St. Neots at 6s. to 7s. per ton, and that it will be possible to supply electrical energy in London at ½d. per unit, or less than the Administrative Company's quotation of last session. One would imagine that the advantage of generating half-way to the source of coal supply would be swallowed up by the increased capital expenditure that the transmission and the losses *en route* will occasion. The day we hope is not yet when Parliament will allow London to be largely dependent upon electricity generated at such a distance from the area of distribution, and making an aërial flight of the kind proposed from one place to the other. The proposed initial pressure is to be 20,000 volts; but the overhead lines will be constructed in such a manner that the pressure can be increased to 40,000 if necessary. The Great Northern Railway Company regard the scheme very favourably. Another power scheme is one proposing to generate electricity in the Kent "coalfields," and bringing it to London along the South-Eastern Railway. Among the promotions of the established concerns is one by the Metropolitan Electric Supply Company, who are proposing to extend the district defined by their Act of last session to other places in the counties of Middlesex, Hertford, Buckingham, Berks, and Surrey; and there are others by the London Electric Supply Corporation, the Charing Cross Company, and the City of London Company. A Bill is also being promoted by no less than seventeen London Companies, to enable them to make agreements and combinations. A similar project comes from the "West London Electric Undertakers' Association." Verily, London is being overdone electrically. But the established undertakings are going to make a fight for it.

It is notorious that municipal authorities are fond of exceeding their legal powers, although they, above all people, ought, for example's sake, to keep themselves at the summit of rectitude. They have a great deal to do with the control of the police, and with the administration of the laws; and they exact very strict obedience to the laws from those who come within their jurisdiction. Just lately we had occasion—and not for the first time—to write of the errors of certain of the foremost municipalities in outrunning the constable in connection with their electricity undertakings, and setting at nought the authority of the Local Government Board. This electricity business brings the municipalities athwart a lot of people; and it is frequently causing conflict between them and the Electrical Contractors' Association. The Association have been having a lively time of it lately in keeping municipalities who have not the statutory power to carry on electrical contracting work from interfering with the business of the members of the Association. Municipalities large and small come under close surveillance; and let there be any exceeding of legal powers, the Association do not respect size or influence. They are now taking proceedings against the Sheffield Corporation for carrying on contract work. It is stated that a leading K.C., and one of the Counsel to the Treasury, have given their opinions in very explicit terms that the Corporation are acting *ultra vires*. The action, it is stated, is to be pushed on as quickly as possible, "in order to bring the Sheffield Corporation into line with other municipal corporations." The Sheffield Electricity Department certainly do not, in view of the price of gas in the city, enjoy the greatest freedom in respect of their exertions to increase the custom for electricity. Pressure has also been brought to bear on the Huddersfield Corporation, with the result that they are going to insert in their Bill in the coming session clauses enabling them only to wire houses through electrical contractors. Bath has been stopped in its little flights into competitive business, and so has Todmorden. Previous to these, the authorities at Newport, Chippenham, Tamworth, Ealing, Marylebone, Shoreditch, and Stoke fell before the attacks of the Association. It is rather funny that municipal electrical departments should require so many agencies—from the Local Government Board to the Electrical Contractors' Association—to keep them in something like order; but these agencies, with all their watchfulness, are not capable of perfect success. If there exists a loophole through which the undertaking can benefit—no matter to whose detriment—we will give any municipal electricity department the credit for being able to find it.

An exceedingly candid address has been delivered by Mr. S. L. Pearce (Electrical Engineer to the Manchester Corporation) to the Manchester Section of the Institution of Electrical Engineers. It has been our pleasure in times past to acknowledge the stimulating effect that electrical competition has had upon the gas industry in the lighting field; and we are glad to see that the recognition is now reciprocated. Mr. Pearce tells us that it has been due to the competition of the gas industry that electricians have been spurred on to improvements tending to cheaper production of light; but proceeding to take account of what he says, the "improvement" is not striking in the matter of complete success. For example, the want of uniformity is still a failing with the Nernst lamp. This is most noticeable in the life of the burners, and is also noticeable in the rate at which the candle power falls off. Hopefully, Mr. Pearce looks upon the tantalum lamp, but he does not condescend to notice the restriction in use to which

attention has recently been called. As to the osmium lamp, the "initial" difficulties have yet to be overcome. The operation of overcoming them is certainly a wearying one. Notwithstanding the claims of the inventors to superiority over all other electric lamps, we are now told that the progress made in the development of the mercury vapour lamp is so small that it can hardly be said to have emerged into the practical stage. The unsteadiness and inherent troubles of the flame arc lamp are still existent. But Mr. Pearce minimizes them with skill, by omitting to state whether the attempts that have been made to surmount them have, in his opinion, been successful. This is how he puts the matter: The early defects of the feeding mechanism, so as to keep the arc in a fixed position under the reflector, were responsible chiefly for the unsteady and unsatisfactory light that was produced. The impregnation of carbons with calcium, magnesium, or other salts has received considerable attention of late; and many forms of electrodes of a composite nature have been devised, with the object of securing the steadiness of the arc, the lessening of the rate at which they are burnt away, the elimination as far as possible of the noxious vapours that are given off, and a lower first cost. One of the main objections to the flame arc is the fact that it does not admit of being enclosed, although efforts are being made to partially secure this end by the employment of magazines which shall contain sufficient carbons to obtain fifty hours of burning. The perfect magazine lamp has been coming a long time. Whether present-day manufacturers will meet with any better success than those who have previously attempted it, is an interesting point certainly. Mr. Pearce is deserving of thanks for his frankness.

The special interest that Mr. Pearce has taken in the street-lighting controversy is known to our readers; and it will be within their recollection that he recently admitted that the gas industry was on the right lines in adopting, for the proper diffusion of light, lower centres of illumination at more frequent intervals than electricians have done as a rule. He now admits that high-pressure gas lighting is a competition that will have to be seriously faced; and he concedes that improved systems of gas lighting are economical as regards the amount of gas consumed, maintenance, and labour—a figure of 1·08d. per 1000-candle-power-hours having been, in one instance, given as the inclusive cost. Electricians parade the feebleness of their case by continuing to charge incandescent gas-mantles with being responsible for great variations in illuminating power. We can only think that their ignorance is assumed for a palpable purpose. It is an extremely weak reed, in view of the experience of local authorities. Mr. Pearce was one of the first to run off with the fallacy that the "average total cost per candle power per annum" was the correct basis on which to judge the expense of competing systems of lighting; and how pleased other electricians were to take up the running! The average total cost per candle power per annum has had an ugly reflection for the ratepayers in the total of their electric-lighting bills per annum for the illumination of a few miles of streets. We submit to Mr. Pearce that the true method of adjudging relative cheapness is to take the total cost per mile of street, allowing in the competing cases an equal given effective and uniformly distributed illumination. There would be nothing "useless" or "misleading" about this. As we have said before, city and town councillors who are not electricians accustomed to small units and capable of working to the infinitesimal, want to know precisely what a thing is going to cost them for a given quantity, utilized to the best advantage. "Extravagant statements" have been made, but none more extravagant than those that have emanated from the candle-power-per-annum gentlemen (such as Mr. Bailey in the City of London), who apparently prefer not to sell their light on ordinary commercial lines.

Another sectional President of the Electricals—Mr. Munroe—has made a somewhat foolish comparison in connection with this matter. He does not think that for street lighting the best test is a "general look round," nor even photometric measurements. He is of opinion that a small print book containing unfamiliar names and figures is the best test. He went into Queen Victoria Street with a diary, and found it was unreadable 15 yards from the new lamp-posts. Of course, the personal equation comes in in this "system" of testing as well as in the photometer-room. He then went to Blackfriars Bridge approach where there are modern flame arc lamps, and was there able to see to read at a distance of over 100 yards! The humour of the thing is found in the fact that in Queen Victoria Street, we have ordinary high-pressure gas street lighting; in the small area constituting Blackfriars Bridge approach, there are four flame arc lamps and three high-pressure gas-lamps all grouped together. Mr. Munroe ought almost to have been able to see his diary the other end of the street; besides which we have an idea that this gentleman from across the Border could not get a hundred yards away from Blackfriars Bridge approach without coming in contact with another lamp. He must find a more sensible comparison than this, if he desires people to take him seriously.

The Midland Junior Gas Engineering Association will meet next Saturday afternoon to hear a paper by Mr. G. W. G. Tatam on "Some Physical Aspects of Gas Manufacture." The author will deal with combustion as applied to gaseous firing, carbonization, condensation, washing and purification, and enrichment and stability of gases, and storage.

MUNICIPAL TRADING AND OPPRESSIVE RATES.

Once more Lord Avebury has bent his bow and sent a shaft flying at municipal trading. This is found in two articles on "The Duties and Functions of Local Authorities," which appeared the early part of last week in "The Standard." The title does not shine for its pertinence to the matter which succeeds, for his Lordship does not, in the whole course of the articles, construct anything which gives uninformed readers any notion as to what are the duties and functions of local authorities. It is a case of absence being expected to give conspicuousness; every reader being left to draw his own conclusions as to what the duties and functions of a municipality are from the distinguished writer's attack on their appropriation of certain administrative work of a specialized commercial nature for which they are by constitution totally unfitted, as the financial results so clearly declare. Lord Avebury is a trusty friend of the ratepayer; and the only regret one feels in connection with these articles is that their publication is confined to the one paper. His arguments are not new; but the articles show that their strength is not impaired, but is supplemented, by time, and that they stand unaffected by the impotent assaults of provoked, but much embarrassed champions of municipal virtue in all things. Lord Avebury has a manner of marshalling and presenting his facts with an unembroidered straightforwardness which commands attention and respect, and must by their repetition and circulation have effect in stimulating knowledge of the evil results of municipal incursion into venture that is altogether foreign to the duties and functions of civic administration.

It is not by any means a matter to inspire confidence in the present system of managing our public affairs to learn, from such unimpeachable sources as Lord Avebury quotes, that the local expenditure of the United Kingdom grew from 36 millions in the sixties to 76 millions in 1891-2, and to 144 millions in 1901-2, or nearly double in the ten years. "What necessity is there," the eminent economist Sir Robert Giffen asks, "either in increase of population or any other factor for these gigantic outlays?" The answer has yet to be produced. But the increase in the rates and taxes of our railways, our industries generally, and even on our own private demand-notes, are most expressive of the effect. In 1903, the local rates and taxes paid amounted to £4,493,000, which represented an increase of 100 per cent. in ten years. Take as an illustration from his Lordship's articles one effect of this increase within five years:

> In 1898 the rates and taxes paid by the Gaslight and Coke Company were £220,000, and worked out at 2·51d. per 1000 cubic feet of gas; in 1903 they had risen to £289,000, and worked out at 3·29d. per 1000 cubic feet of gas. And yet the Gaslight and Coke Company have absolutely no voice in the expenditure of the rates to which they contribute so largely. These increases, of course, *pro tanto*, diminish the amount available for dividend, so that we are hit three times—first, by the increase of assessment; second, by the increase of the rates; and, third, by the reduced dividends received from investments.

We are hit beyond the three times mentioned by his Lordship. We are hit by the increased price that we have, in consequence of this additional charge against the Company's revenue, to pay for gas. We are hit, too, by the increased price this and other gas companies have to pay all round for materials purchased from ratepayers suffering in like manner from the greater burden, and transferring it accordingly to their customers. We are hit further by the repression of business in gas caused by the consequential higher price, seeing that the lower the price of a commodity the greater the purchasing power, and the greater the freedom for business, which issues, through the expansion of the business, in the consumer enjoying, by the operation of the sliding-scale, a reduced payment for the commodity.

"Monopoly" is the brief damning description in the municipal vocabulary for statutory private enterprise; but local authorities, or their socialistic or so-called "progressive" elements, avoid recognition of the fact that municipal monopoly, in which the consumer is almost completely unguarded, is the absolute and worst form of monopoly. "Monopoly" as applied to private gas enterprise is a term that the defender of municipal trading must feel, if he will not admit, has lost its force in these times of competition of other agencies for performing the same services, and particularly when these competitive agencies are made the more powerful by the backing of the rates, and the unfair methods of management to which municipal ownership lends itself, and which conceals the true financial workings and results. Lord Avebury deals with these matters; and it is the part of his articles that strikes forcibly very close home. In attacking the point as to the real existence or otherwise of the profit that local authorities claim to make from their productive undertakings, the juggling whereby clerical and accountancy work, rent, legal expenses, and so on are charged to the general municipal account is brought into relief; the small allowance for depreciation is commented on, as well as the preference in the matter of assessment; and the involved and sometimes misleading nature of the accounts is pointed out. Here are examples:

> At a meeting of the Brighton Corporation on April 21, 1904, on the consideration of the minutes of the Works Committee, objection was taken to the expense of renovating ornamental arc light columns being charged to the Works Committee, instead of to the electricity undertaking. It was pointed out that the system tended to show false profits,

and made the net results of the trading returns misleading. Mr. A. Beazley, in a criticism of the Cardiff Corporation accounts, states in regard to the electric lighting works that nothing whatever has been charged for depreciation, if we except the sum of £500 set aside as a reserve fund in the year ended March, 1903, although some £200,000 had been spent. Mr. J. P. Elms, the Secretary of the Newport Ratepayers' Association, states that in the borough there are electric light works owned by the Municipality costing about £100,000, which, at 4 per cent., would give a net rateable value of £4000. The actual sum entered in the rate book is £432; but it is sought to assess the local Gas Company, with which the electric light works are in competition, at twenty times as much as the latter. As the Overseers of the parish are nearly all members of the Borough Council, the largest ratepayer in the Union is allowed to assess his own property.

An example quite up-to-date of this confusion of accounts might have been found by Lord Avebury in the report of Mr. Carson Roberts, on his audit of the Fulham District Council's finances for the year ended March last. In addition to other changes which are to be made in the accounts, it is stated by Mr. Roberts that, before a true profit and loss account for the electricity undertaking can be made out, the revenue must be charged with an appropriate share of the central establishment expenditure, and with the actual cost incurred by an overdraft on cash account. Another anomalous condition of affairs is that it has been represented in the accounts that reserves for renewals, to the amount of £7400, has been "set aside out of *rate* contributions in aid of the undertaking." Of this £3600 has, in fact, been spent on paving works, and has been treated as having being restored on loan to the general rate fund. With reference to the question of depreciation, it is not stated in these articles, but it will interest readers to learn that the London County Council are seriously considering the expediency of curtailing the period for electric lighting loans to the Borough Councils. The initiative in the matter has been taken by the Local Government Board, who has for some time past realized that it is an unsound policy to allow a 42 years' period for repayment on plant with a far shorter life. The period would not be too long (says an electrical contemporary) if proper sums were set aside for depreciation; but this is not done in the majority of cases.

Then Lord Avebury, in dealing with profitable undertakings, gets back again to gas and water; and we read—

> The principal cases of so-called "profit" are derived from water and gas works. In both these cases, municipalities have monopolies. They can charge what they like, and, consequently, it is easy to show a profit on paper. Moreover, it is, I think an important consideration that where the gas or water is supplied by companies, the municipalities watch jealously—I do not say too jealously—over the quality. But where it is supplied by the municipality, we have no such guarantee. On the whole, it seems to me that the sliding-scale arrangement, such as we have in London as regards our gas, is the best arrangement for the public.

In such cases as gas and water, municipalities may show a profit —a "paper" one Lord Avebury designates it—but, when we come to other undertakings, the case is very different. His Lordship deals unsparingly with the London County Council in this connection, and also generally with the accounts of municipal electricity undertakings, which for the year 1903 (his Lordship might have got closer to date without damaging his argument) showed losses in more than sixty towns in the United Kingdom. The total amount of capital expended in these towns amounted to £5,881,351; and the loss on working was £86,649. It is evident, too, that the accounts do not exhibit the full loss. In electricity accounts which we were lately reviewing, it was shown that what Lord Avebury has advanced in regard to charges for administration, rates, and so forth, was abundantly illustrated by the absurdly low figures entered. Moreover, in comparatively few places is any sufficient sum placed to depreciation and reserve; and it is not difficult to foresee the time when there will be electricity undertakings, now run on the principle of sinking funds being all-sufficient, that will be a greater burden upon the misguided communities owning them than they are at present while plant is in a decent working state. Regarding paper profits, Lord Avebury includes among his examples the following:

> Mr. Robert Donald has pointed out that Manchester reduced its rates in 1900-1901 by 7d. in the pound through municipal trading. This is the way it was done: The Corporation wanted a subsidy of £50,000 in relief of rates from the gas undertaking; and, as there was no surplus, the price of gas was raised 3d. per 1000 cubic feet, in order to yield it. This is quoted as a profit. In reply to Mr. Donald's argument, it has been urged that there was a rise in the price of coal. Other gas-works, however, did not raise their prices. But whether the Gas Committee were or were not justified in the charge, does not affect my present argument. To take money out of one pocket, put it into the other, and then call it a profit, is a singular instance of mental confusion.

Though his argument here is quite plain, his Lordship is perhaps a little hard on Manchester. There were gas undertakings which, through the possession of large reserve funds, did not raise their prices at the period named; but increases were so general that it is hardly fair to single Manchester out in this way

Turning to other parts of the articles, Lord Avebury mentions that, in ten years, the outstanding loans of local authorities in England and Wales have risen by no less than 155 millions, and amounted in 1903 to over 370 millions, while those of the United Kingdom in 1902 were 412 millions.

What more do we want than these impressive figures to assure us that, if matters are allowed to drift, there is no doubt that local indebtedness and local rates will still heavily increase in the future. One main cause, Lord Avebury observes, is the fact that municipalities undertake many functions which used to be left, and had better be left, to private enterprise. The principal objections to the new departure are dealt with at length; but they may be epitomized thus—(1) That it will involve an immense increase in municipal debt. (2) As there will not be the same stimulus to economy and attention, there will be a great probability, not to say certainty, that one of two things will happen—either there will be a loss, or the service will cost more. (3) The legitimate functions and duties of our municipalities are already enough, if not more than enough, to tax all their energies, and fill up all their time. (4) In some cases the municipalities will defeat the very object they have in view. (5) It will involve municipalities in labour disputes. (6) It involves the creation of monopolies. (7) It is a serious check to industry, to invention, and to discovery.

CONFERENCE ON SMOKE ABATEMENT.

As was mentioned in a short paragraph in the "JOURNAL" for the 24th of October (p. 228), a Conference and Exhibition, dealing with the subject of smoke abatement, are being arranged to be held next month under the control of the Royal Sanitary Institute and the Coal Smoke Abatement Society. We have now received the programme and details of the proceedings, which will be held on the 12th, 13th, 14th, and 15th of December in the Horticultural Hall, Vincent Square, Westminster, S.W. The inaugural meeting will be presided over by His Grace the Duke of Fife; and Sir Oliver Lodge will deliver the Presidential Address. This will be on Tuesday, the 13th, at 8.30 p.m. The three succeeding days are devoted to particular branches of the general subject. Thus on Wednesday, under the chairmanship of Sir George Livesey, from 11 a.m. to 1 p.m., "Domestic Smoke Abatement" will be discussed—three or four papers being read. Dr. H. A. Des Vœux will deal with "The Abatement of Smoke from Private Houses;" Mr. A. S. E. Ackermann, with "The Distribution of Producer Gas as a Means of Alleviating the Smoke Nuisance;" and Miss M. Agar, of the Metropolitan Gardens Association, will discourse on "The Effect of London Smoke on Vegetation and Tree Life." Sir Charles Cookson, K.C.M.G., is down for a paper, the subject of which is not announced. The afternoon of that day will be spent in visiting the Chelsea generating station of the Underground Electric Railway Company, Limited. "Factory and Trade Smoke Abatement" is the general topic for Thursday, when Sir William Preece will be in the chair; and again three or four papers will be contributed. This day's visit will be to the South Metropolitan Gas Company's works in the Old Kent Road. Sir William B. Richmond presides over the last day's proceedings; the topic being "Administration, Legislation, and Necessary Reforms." Six names are given as contributors of papers to this section. The final visit, on Friday afternoon, will be to the Abbey Mills pumping station of the London Sewage Outfall Works.

The Conference will sit from 10 till 2 each day; while the Exhibition (which will consist of fuels, various heating and cooking apparatus by hot water, gas, and electricity, besides testing appliances and refuse consumers) will be open to the public from 2 p.m. to 8 p.m.; the admission being 1s. Anyone can be entered as an associate of the Conference upon payment of half-a-guinea, which will include a copy of the proceedings. Application should be made to Mr. E. White Wallis, the Secretary of the Royal Sanitary Institute, at Parkes Museum, Margaret Street, W. As the circular sent out says: "The question of the abatement of smoke and its attendant evils in large towns, including the reduction in daylight and sunshine, has an important bearing on the public health. In addition to the prevention of smoke from factories, much can be done to reduce the volume of smoke from dwellings, by furthering the use of gas and electricity and smokeless fuel, and encouraging improved forms of stove and grate construction." We sincerely hope the Conference and Exhibition (in which the Gaslight and Coke Company will have a special annexe) will meet with a hearty response, and prove a source of general attraction, and bring nearer the accomplishment of the beneficial objects which they are intended to promote.

Mr. Allen Stoneham, the Official Auditor of the Metropolitan gas and water accounts, whose death was recorded in the "JOURNAL" for Oct. 31, left estate of the value of £10,430. Mr. Samuel Mullay, an old servant of the Edinburgh Gaslight Company, who recently died at Lerwick (his native place), left estate of the value of £18,609, of which £11,874 was personal estate in Scotland. Mr. W. Stone, the Chairman of the Swansea Gas Company, left estate valued at £16,585.

On Friday week, the 17th inst., Mr. Isaiah Breckenridge, the General Foreman in the Dawsholm Gas-Works of the Glasgow Corporation, who for the past seven years has been Treasurer of the Dawsholm and Temple Gas-Works Employees' Friendly Society, was presented with a gold watch and albert, and his wife with an opal ring, in recognition of his valuable services rendered to the Society. The presentation, which took place in the works, was made by Mr. A. M. Macleod, the Station Manager.

DISTRESS AND THE CHILDREN.

A Suggestion by Mr. Henry Woodall and the Nucleus for a Fund.

As the "JOURNAL" was being prepared for press yesterday, the letter given below was received from Mr. Henry Woodall, of Llandudno. It contains a proposal to establish a Gas Industries Benevolent Fund, with a scheme for its utilization; and a cheque for £52 is the tangible testimony of Mr. Woodall's sincerity in the matter, and of his belief in the charitableness of the gas industry. We gladly print Mr. Woodall's letter tentatively, to elicit views on the proposal, and for an expression of opinion—if it is thought desirable that the gas industry should distinctively take its share in assisting the poor in the manner delineated—as to whether the fund should be administered by a separate Committee or by the Benevolent Fund Committee of the Institution. There is one of his suggestions—the setting aside for the purposes of the fund 1 per cent. of the profits of gas undertakings—that is certain to be received with little warmth. Beyond this remark, nothing more need be said on our part. We have ever been, and ever shall be, glad to open the columns of the "JOURNAL" to any well-commended benevolent object connected in any way with the gas industry; and, if Mr. Woodall's scheme appeals to our readers, and they desire it, it will (until such times as the question of administration is settled) be a pleasure to us to receive subscriptions to the fund, and to at all times acknowledge the contributions in these columns.

Mr. Woodall's letter is as follows:—

Proposal to Establish a Gas Industries Benevolent Fund.

Sir,—The specially distressful conditions of the present season, as affecting the poorer classes, naturally incline us all to inquire as to means whereby they can be alleviated; and it has occurred to me that, just as various fraternities or societies have their distinctive benevolent institutions, so may proprietors and workers in gas undertakings unite in charitable effort. Why should we not?

For fifty years, speaking from personal experience, I have known gas properties, even more stable in value than Consols, and twice as remunerative. True it may be that less than any other industry is ours responsible for unemployment. Then, the greater reasonableness of a thank-offering! Our prosperity confronts the adversity of others; and the very phenomena which conduce to the general distress, are just those which we count upon as gain-givers. Indeed, so intent upon dividend-making are we, that we are prone to deplore a mild and sunny winter, and to rejoice over prolonged periods of frost and fog. It is very selfish, no doubt; but, being human, we cannot well help it.

There is another side to our nature, however; for though we love gain, we also love to give. And I plead the foregoing considerations as reasons why gas proprietors and workers should give freely.

The problem which faces us to-day is how to give without aggravating the evil we desire to remove. We are surely on safe ground in dealing with the children. These at any rate should be a grand asset of the Nation; it is our fault if the asset is not realized.

Now for my proposal. In every town, and contiguous to almost every village throughout the country, there is a gas-works, with its Directors, Manager, and Secretary. These, in all suitable localities, would, if required, form themselves into Committees, assisted by their wives and daughters, who would find suitable homes for any number of children, and would keep watch upon their well-being. In London, selection would be made of children between the ages of seven and ten; and these, properly clothed, would be sent to the care of the various Managers, who would meet them at their destinations.

Now as to the cost. I find that five shillings per head per week is ample to cover all charges. How is this to be provided? Eventually I hope to see a Gas Industries Benevolent Association assimilated by our Institution; but as that must be in the future, however near, I would suggest reliance on personal action for the present.

Thus, Sir, I would ask you to kindly open your columns to the receipt of offers from Gas Managers located in healthful and cheerful districts—rural or seaside—of assistance on the lines indicated. Agents would then be found to choose the children, and forward them to their new homes, and a sum of £13 per child would be sent to the Committee, who would bank it, and pay the required sum from week to week, throughout a year.

This system, as I have remarked, would help the object immediately. But to be permanently useful something more reliable must be established; and to this end, I would suggest, an annual donation from each Gas Company, of 1 per cent. of the profits of the undertaking. Such payment would not affect a dividend; would in fact be inappreciable; and yet would amount to a sum which, I conjecture, would suffice for the maintenance of 3000 children. Thus, without any effort, and without sense of loss, an institution would be established which, for value to the Nation, and the happiness of all concerned, would rank with the noblest efforts of the time.

Of course, we may fairly calculate that private contributions, and the collective offerings of employees, would add materially to the fund.

I have said that, more than others, gas proprietors are called upon to render such service; but may it not be that their action would quicken members of other corporations, and industries, to similar benevolence?

In the hope, Sir, that you will agree to take charge of contributions until a Committee is formed, I enclose a cheque for £52 to cover the cost of four children for one year.—Yours, &c.,

HENRY WOODALL.

7, *South Parade, Llandudno.*

Visit of Scottish Juniors to Glenboig.

The members of the Scottish Junior Gas Association (Western District), to the number of about fifty, journeyed to Glenboig on Saturday afternoon, and were shown over the fire-brick and retort works there, by Mr. Dunnachie, the Managing-Director, and his son. The processes were shown in great detail; and the section devoted to retort-making met with the greatest attention of the members—the actual building up of the retorts being shown. Afterwards the party were hospitably entertained by the firm. Mr. Dunnachie, in an interesting speech, mentioned, among other things, the great benefit it would be if the standardization of retorts could be introduced. In the absence of the President, Mr. Bell, Mr. James Macleod (Provan), the Vice-President, in the course of his reply, said the members would look on a retort after this visit with much greater interest, knowing as they did now the amount of skill and labour involved in the making of it. Mr. Langlands also thanked the firm in the name of the members. Thereafter the members took part in an impromptu smoking concert. The unanimous opinion was that this visit has proved one of the most successful yet undertaken by the Association.

Tapping a Trunk Water-Main under Pressure.

At the close of the description, in the "JOURNAL" for the 7th inst., of Smith's patent main-tapping machine, which Messrs. Clark W. Harrison and Co. (Harrison Water-Works Appliances, Limited) had employed to tap a gas-main in connection with the new works of the Winchester Water and Gas Company at Winnall, it was mentioned that the machine was about to be used for making a 16-inch connection with a 42-inch trunk main for the Metropolitan Water Board. The operation was successfully performed at the Old Ford pumping-station on Monday last week. It was not convenient for the Chief Engineer (Mr. W. B. Bryan, M.Inst.C.E.) to have the main shut down and emptied for about a mile of its length, which would have been necessary with the ordinary system of tapping; but by the aid of the machine the connection was made without reducing the pressure or interrupting the service in any way. In the article already referred to, the split collar employed for the Winchester connection was shown. The one used at Old Ford was a 42-inch, with a 16-inch branch collar. The larger collar was placed round the main and the flanges bolted together. Between the main and the interior of the collar there was a space of half-an-inch, which was filled with molten lead; a clay rope being placed inside the neck of the 16-inch branch outlet to prevent the lead from running into the branch. The lead was then thoroughly caulked round the 42-inch main, and afterwards round the inside of the neck of the 16-inch branch. This was caulked last for the reason that it was upon this particular joint that water-tightness depended. The 16-inch valve was then connected to the branch outlet, and the machine to the valve. On the shaft of the machine was a 16-inch cutter, in the centre of which was a 1½-inch drill, which retruded 3 inches beyond the cutter. In performing the operation, this drill first pierces the pipe, and the water rushes through the valve into the machine, but cannot get beyond the stuffing-box in the gland through which the shaft works. On the drill there is a thread which forms a female thread in the cast-iron disc cut out, thus preventing it from falling into the main. When the disc is cut out, the shaft of the machine is withdrawn; pulling the cutter, together with the 16-inch disc, back through the valve into the machine. The valve is then closed, after which the machine and the disc cut out are removed, and the new branch main is connected up ready for service.

Sir Richard N. Howard, of Greenhill House, Weymouth, died early on Saturday morning at the age of 73. Deceased was a Solicitor, and practised for many years in Weymouth, of which borough he was seven times Mayor. He was the owner of the Portland Gas-Works, before they were acquired by the Urban District Council in 1900. Sir Richard was on the Commission of the Peace, was a Coroner, and in 1894 was appointed Town Clerk of Weymouth—a position from which he only recently retired on account of advancing years. He received the honour of knighthood in 1886.

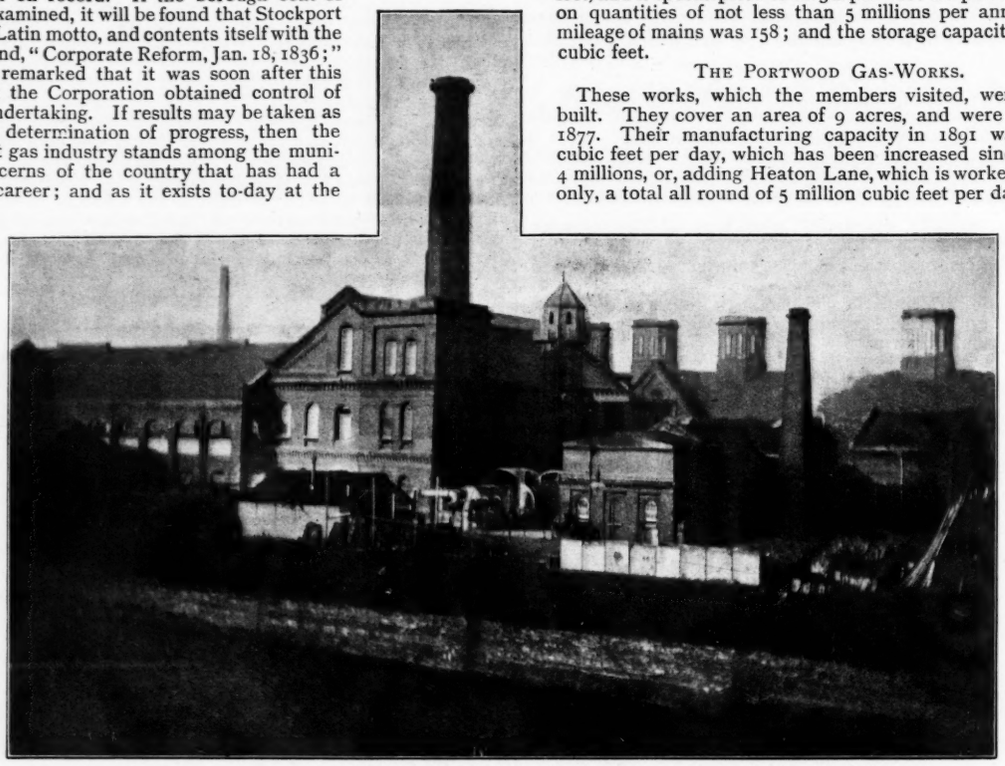
MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

Quarterly Meeting in Stockport.

Stockport being within easy distance of Manchester, the President of the Manchester District Institution of Gas Engineers (Mr. S. Meunier, the Engineer of the Stockport Corporation Gas-Works) had the pleasure of welcoming, with the Chairman (Alderman J. R. Clarke) and other members of his Committee, a large representative body of his *confrères* at the 144th quarterly meeting on Saturday. The *rendezvous* was the Portwood Gas-Works; and the members thoroughly interested themselves—in fact, they could not avoid so doing where so much of interest abounds—in these works—the most important of those under their President's charge.

The History of the Undertaking in Brief.

Before referring generally to the character of the plant at Portwood, a few historical notes concerning the undertaking may be placed on record. If the borough coat of arms is examined, it will be found that Stockport eschews Latin motto, and contents itself with the plain legend, "Corporate Reform, Jan. 18, 1836;" and it is remarked that it was soon after this date that the Corporation obtained control of the gas undertaking. If results may be taken as the final determination of progress, then the Stockport gas industry stands among the municipal concerns of the country that has had a brilliant career; and as it exists to-day at the topmost point in its progressive course, so far as it is concerned, the ever-present suggestive legend of the borough can urge no further lesson upon the Gas Department. There can be no "reform" where the most approved methods of management are being followed, and followed vigorously. All that can be done is to maintain the management and the policy, and so create, as heretofore, the necessary changes in it as the course of the times demands; and then the eminent progress of the past cannot fail to be the progress of the future. Upon the position of their affairs, the Chairman and members of the Gas Committee, with their Engineer and General Manager, are here, and were on Saturday, most heartily complimented.



General View of the Works from Across the River.

It was in the year 1821 that Stockport was first supplied with gas by a private non-statutory Company; an Act of Parliament not being obtained until 1825. The first works were erected in Millgate; and in 1891, when the present Engineer was appointed, those works had plant of a capacity equal to about 250,000 cubic feet per day. It has now been dismantled, and is used as an electricity generating station; which, to say the least, is not doing honour to the memory of this old site in the history of the borough gas supply. However, between the years 1826 and 1830, the Heaton Lane works, which were in another township, were erected by a Mr. Henry Booth in opposition to the Stockport Gas Company; the works on his death in 1834 being purchased by Mr. Thomas Robinson.

It was in 1837 that the Corporation of Stockport obtained powers to purchase existing, or to erect new, gas-works; and in 1839, the Council came to terms, and bought up both undertakings as they stood for the sum of £21,493 10s.—the purchase being finally ratified in January, 1839. The first Committee consisted of the Mayor (Mr. Ralph Pendlebury), Aldermen William Andrew (the first Chairman) and Jonathan Thornhill, Councillors Alfred Orrell, Thomas Stitfoll, James Bradshaw, George Oldfield, William Nelstrop, and Joseph Rayner.

At this period, the number of miles of mains was about 8; and the storage capacity was equal to about 18,000 cubic feet, divided between three small holders of equal size. The year's rental was £4766. The receipts from residuals was £207; and the price of gas was 7s. 10d. per 1000 cubic feet. To learn of the progress of the undertaking, which reflects the progress of Stockport, these figures have only to be compared with the financial conditions of last year. For the past year, the figures stand as follows: Capital, £249,601; rental, £86,331; and receipts from residuals, £15,321. The price of gas was 2s. 4d. per 1000 cubic feet net, with discounts for industrial purposes up to 10d. per 1000 cubic feet, and a special price of 1s. 3d. per 1000 for power purposes on quantities of not less than 5 millions per annum. The mileage of mains was 158; and the storage capacity 3,900,000 cubic feet.

The Portwood Gas-Works.

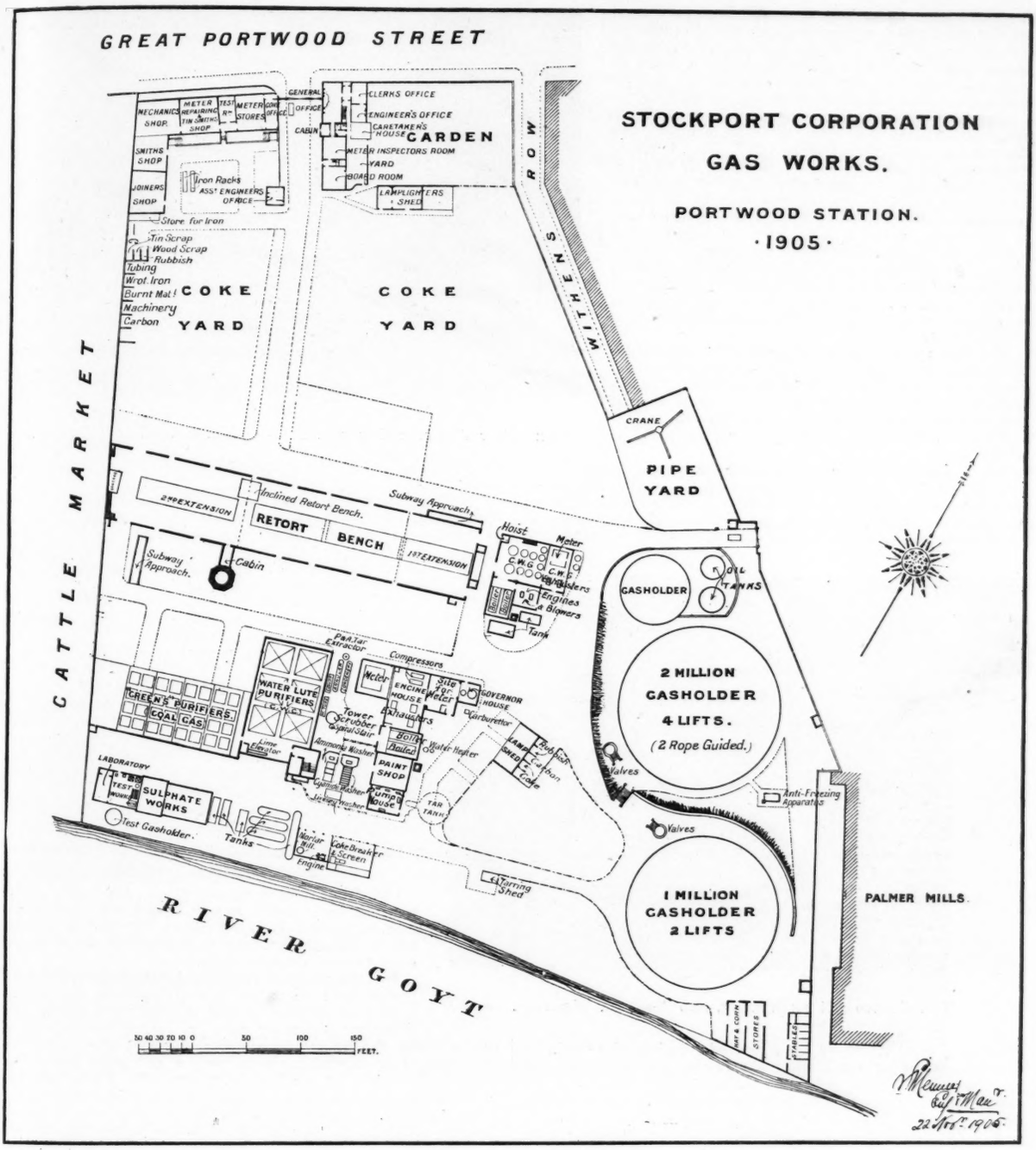
These works, which the members visited, were the last built. They cover an area of 9 acres, and were erected in 1877. Their manufacturing capacity in 1891 was 750,000 cubic feet per day, which has been increased since then to 4 millions, or, adding Heaton Lane, which is worked in winter only, a total all round of 5 million cubic feet per day.

The retort-house, it was seen, contains 25 settings, twelve of which are as originally designed. These are to be taken out next season, and replaced by sixteen beds of inclined retorts. The carburetted water-gas plant is equal to a capacity of 1,600,000 cubic feet per day; two new generators of 800,000 cubic feet each having replaced the original 500,000 cubic feet sets erected in 1896. The relief holder of the carburetted water-gas plant is on the Gadd and Mason spiral-guided principle.

The original condensers (of the annular type) have been considerably heightened; and two additional water-cooled ones have been added. The original tower scrubber, too, has been supplemented by a Clapham rotary washer. The purifiers that were erected in 1877, and are 24 feet square, are now used in conjunction with the carburetted water-gas plant; new ones, 56 feet by 27 feet, of the Green luteless type, having been installed for the coal gas in 1899. The connections are all in view; and the valves are a simple type of water-valve. A point of considerable interest is that the elevating and conveying of material is carried out by means of an electric travelling hoist.

In addition to the ordinary adjuncts of a gas-works, there is a washer for the extraction of cyanogen in the form of sulphocyanide of ammonia, and likewise a Livesey washer working Mr. Colson's naphthalene process.

In the engine-house (which also contains meter and governors) are fixed two Ingersoll-Sergeant compressors, delivering gas at a pressure of 25 lbs. into a receiver from which, by means of a Foster reducing-valve, gas at a pressure of 15 lbs. is sent into



a 4 inch and 3 inch Mannesmann steel main supplying a village five miles away. At the extreme end, the supply is delivered into the distributing-mains through Crawford regulators.

The workshops and stores were inspected. These were erected in 1894, and contain carpenters', blacksmiths', fitters', and meter-repairing departments, each fitted up with the necessary machines, tools, &c. Nearly all the repairs required on the works are carried out by the Corporation's own staff.

The stables, hay and straw stores, and lamplighters' shed are built of timber framing, 4½ inches thick, filled with brick. The mortar employed on these, as indeed on all other buildings for some years past, is made entirely from the works clinker and spent lime.

Regarding the gas storage, No. 1 holder (140 feet diameter) is still as erected, with two 30-feet lifts; while No. 2 (150 feet diameter) has had two additional lifts added. These are on Messrs. Ashmore, Benson, Pease, and Co.'s well-known principle of cable-guiding; and both lifts extend above the columns and framing. An interesting feature is that, in order to reduce back-pressure when the work was completed, the trussing of the old crown was cut off, and fixed permanently in the tank, to carry the new crown; the whole of the extension, it was learned, being carried out with the water in the tank.

At the conclusion of the inspection of the works, the members had luncheon together at the Warren Bulkeley Hotel.

The Meeting for the transaction of the business before the members was held in the Court House—Mr. S. Meunier, of Stockport (the President), in the chair.

The Hon. Secretary (Mr. H. Kendrick, of Stretford) read the minutes of the two last quarterly meetings; and they were duly confirmed.

Vote of Thanks to the Mayor.

A vote of thanks was unanimously accorded to the Mayor and Corporation of Stockport for the loan of the Court House for holding the meeting.

Appointment of Scrutineers.

Messrs. S. E. Halliwell (Littleborough) and F. D. Richmond (Heckmondwike) were appointed Scrutineers of the ballot-papers.

Alterations of the Rules.

It was proposed that Rule 1 should read as follows:

This Institution shall consist of members and associate members; the qualifications of each shall be as follows: *Members*—Resident engineers or managers of gas-works, and gas engineers solely employed as consulting engineers, and not engaged as agents for any trading or manufacturing firm. *Associate Members*—Assistant-engineers or assistant-managers of gas-works making 500 millions or more per annum. Only the members of the Institution shall have a vote at any of the meetings of the Institution.

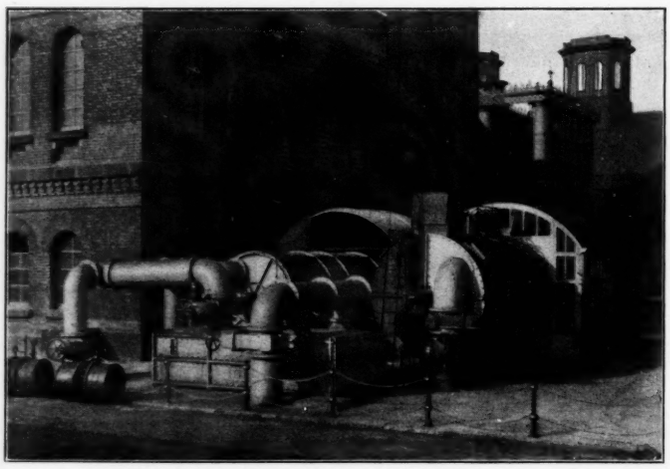
Various verbal alterations were suggested in several of the other rules, consequent upon the alteration in the framing of Rule 1. It was also proposed that the comm encement of Rule 14 should read: "A list of all members in arrear with their subscriptions will be posted in the meeting-room at the annual meeting."

The PRESIDENT, in placing the resolution before the members, said the rule with regard to members was the same as it had been for some years past. It would be remembered that at the last meeting he had expressed a wish that the rule should be rather amplified; and, in the result, it was referred back to the Committee for further consideration. The Committee had, by a majority, agreed upon the rule with regard to the admission of associate members in the form appearing above. He (the President) did not think the rule went far enough; but, of course, he bowed to the decision of the majority. It would now be for the meeting to say whether they would adopt the recommendations of the Committee.

Mr. ISSAC CARR (Widnes) considered the recommendation an excellent one. If at any subsequent period it transpired that something further was necessary, the rule could be reconsidered. He proposed that the rules be altered in the way now suggested.

Mr. J. W. MORRISON (Sheffield) seconded the proposition.

Mr. H. TOWNSEND (Wakefield) said he did not wish to move an amendment, but considered the qualification for associate members was placed too high. He thought it might be extended to assistants in gas-works making 250 millions. He knew several assistant-managers of works making 250 millions and upwards who would be shut out by the proposed rule, but who would be very pleased to join the Institution; and he was quite sure this qualification would be acceptable to the members generally. He should be very pleased to support the resolution if it were altered in the way he suggested.



THE CYANIDE, NAPHTHALENE, AND AMMONIA WASHERS.

The PRESIDENT said that very point had been brought before the Committee and thoroughly debated. It was felt that if the qualification was made lower than was suggested, it would have the effect of depriving the Junior Association of some of their most valued members. If the matter were sent back to the Committee, he did not think that they would alter their opinion on the point.

Mr. W. W. HUTCHINSON (Barnsley) suggested that before names of members were "posted," according to Rule 14, they should be written to, so that anyone who, by inadvertence or forgetfulness, had omitted to pay his subscription, should not suffer.

The SECRETARY said no member had been allowed to let his subscription lapse for want of writing to. Last year all those in arrear had been communicated with at least four or five times; and so long as he remained Secretary, the name of no one would be posted unless he had been previously written to.

Mr. HUTCHINSON said he only made his suggestion as a sort of safeguard.

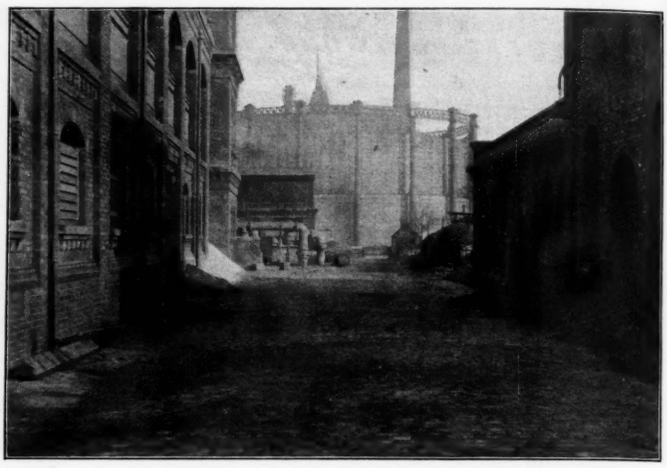
The resolution sanctioning the alterations in the rules was then put and carried.

ELECTION OF DISTRICT REPRESENTATIVE.

The SECRETARY read a letter from Mr. Brearley, notifying the Council that he had sent in his resignation as District Representative on the Council of the Institution of Gas Engineers. A letter was also read from Mr. Dunn, saying that the Council of the Institution had accepted Mr. Brearley's resignation.

The PRESIDENT said the Committee felt that, the Senior Vice-President having resigned the post of District Representative on the Council of the Institution of Gas Engineers, the proper person to succeed him was the next Vice-President. Accordingly Mr. W. Prince, of Stoke-upon-Trent, had been nominated.

Mr. W. SEVERS (Wilmslow) proposed, and Mr. R. H. GIMNAN (Tyldesley) seconded, Mr. Prince's election; and it was unanimously agreed to.



THE NEW PURIFIER-HOUSE (LEFT) AND SULPHATE-HOUSE (RIGHT).

READING OF PAPERS.

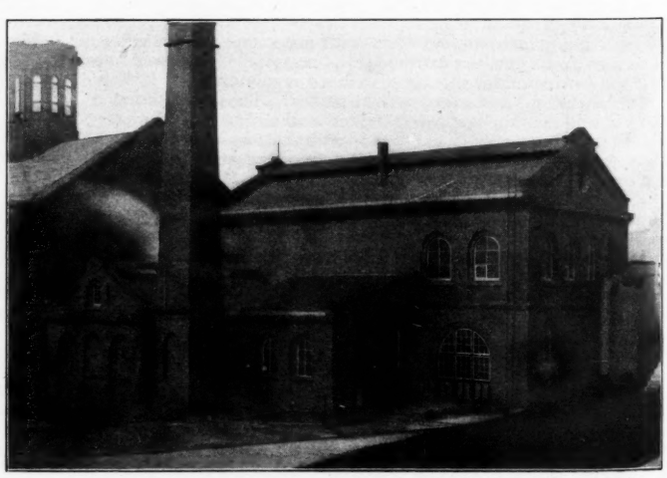
The PRESIDENT, in calling upon Mr. Newbigging to read his paper on "The Price of Coal Gas to Possible Users of Suction Gas and Others," said they had had a promise of a paper from one of their members, who had fallen ill, and had not been able to submit it. He therefore wished personally to thank Mr. Newbigging for stepping in and filling the breach.

Mr. T. NEWBIGGING (Manchester) then read his paper, which was as follows: —

THE PRICE OF COAL GAS TO POSSIBLE USERS OF SUCTION GAS AND OTHERS.

Old fallacies crop up every now and again under new disguises; and it is well to look them full in the face, to prevent our being misled. One of these fallacies is the assumed wisdom of allowing excessive discounts to certain consumers.

It is not generally recognized that statutory gas companies hold their works and maintain the virtual monopoly of their several districts, not simply and solely for pecuniary gain, but largely for the benefit of the public who are gas consumers; and that when a reasonable interest on capital has been earned and paid, and a reserve fund created, the resulting surplus profits (if any) are due to the consumers as a body. Hence the restrictions and limitations imposed by Parliament upon these enterprises. That is, broadly speaking, the law in regard to gas supply as affecting



THE CARBURETTED WATER GAS BUILDINGS.

companies. In some Private Gas Acts discounts are enjoined to special classes of consumers. But this is the exception; and it only serves to show the loose and irregular way in which Private Bill Legislation is sometimes conducted.

In the case of local authorities who possess gas undertakings, the restrictions as to profit are not so close; more latitude being allowed, doubtless under the impression that, the element of personal gain being eliminated, there was no temptation to secure profits beyond what were needed to pay interest on capital and provide a sinking fund to redeem such capital within a given time. That the Legislature was mistaken in this is proved by the fact of the large balances of profit that are carried to the general fund in aid of the rates; such contributions from the gas coffers acting as a kind of buffer to mitigate the blows that would fall with greater force than they now do on other of the civic departments for their blunders, or extravagancies, or misdirected

The Pelouze and Audouin Tar-Extractor, with the Old Purifier-House in the Background.

ambitions. There can be little doubt that, when a revision of the Acts of Parliament relating to gas supply takes place, there will be a limitation of the powers of local authorities in this respect. The Scotch Burghs are so limited now by the Burghs Gas Supply (Scotland) Act, 1876; no profit being allowed to be made by their gas departments beyond what is required by way of interest and sinking fund.

But the clear, patent, unmistakable intention of the Legislature in regard to companies, and also to a less extent in regard to local authorities, is continually being circumvented by the policy adopted in many cases of allowing these excessive discounts to certain favoured consumers, the effect of which is to lay upon the shoulders of the large body of consumers a burden which they should not be called on to bear. Reasons more or less untenable are urged in favour of this mistaken policy. I grant that for large consumption a reduction in price is allowable and justifiable; but it should be to a reasonable extent only—a reduction that will be equivalent to the cost of collection, a possible reduced leakage, the lessened risk of bad debts, a slightly less capital outlay for service-pipes, and an item for reduced maintenance.

The suction-gas producer plant is the latest competitor that has come to disturb the gas manager's peace of mind; and it is being held over him as a *flagellum* which will come down on his head if he does not "fork out the dibs." What then is to be done? The aim in my opinion should be, not to compete with the suction plant by selling the present high illuminating gas at a loss, merely for the sake of gaining or retaining business (that way bankruptcy lies, and injustice to others), but to produce gas that can be sold at a competition price and yet yield the full profit on the sale. Such a gas could undoubtedly be made, provided the restrictions as to illuminating power were abolished and the use of the incandescent mantle were universal. We have not yet attained to that *desideratum*, though we are on the road leading to it.

Things have not come to the pass that, "while the grass is growing, the horse is starving." Alarmists seldom stumble on the right remedy. A healthy competition is good. It keeps one on the alert. The advent of the electric light gave a needed stimulus to gas progress; and the suction-gas plant has already exposed some weak spots, while emphasizing the remedy and hastening its application. Meanwhile, it is some consolation to know that, for the smaller engines, coal gas at the prices which prevail in most places is the cheaper fuel because of its handiness, its trustworthiness, its cleanliness and safety, its greater heating value, the non-requirement of labour—whether skilled or other—in its application, the fact that no capital expenditure is entailed in its adoption, and with, of course, an absence of wear and tear. But even if this should not be so, rather than allow the exorbitant reductions called for, I say give the would-be suction-gas consumers the go-by; the terms they are being encouraged to demand are too onerous to pay for their custom. I have known diamonds to be bought too dear.

The other day, speaking on the subject to one of our gas engineers, he stated that his company were supplying the would-be suction-gas consumers at the rate of 1s. or 1s. 2d. per 1000 cubic feet—I forget which.

"Yes," was my reply, "you are supplying them at a sacrifice of the dividend, or some portion of it."

"Oh, no," he retorted, "we are paying the full 10 per cent. to the shareholders." (As if that was a clincher to my suggestion.)

"At whose expense is this full dividend being paid? Clearly at the expense of the other consumers—those who burn gas for lighting at night, and those who use gas for cooking by day."

"Oh," my friend replied, "but there are certain fixed expenses that will be the same whether you supply the favoured low-priced consumers or not."

"Indeed, and why should the consumers of gas by night for lighting, and the consumers of gas both by night and day for cooking, be saddled, and continue to be saddled, with all the fixed

Green's Purifiers, with Electric Elevator and Conveyor.

expenses, and the others allowed to go scot-free? Where would be the covering profit to clear the fixed expenses, if it were not for the consumers of your commodity for lighting and cooking?"

"But you forget that, with a large day-load, less capital expenditure per 1000 cubic feet is required."

"Less capital expenditure: On retorts? Certainly not. On purifiers? Assuredly not. On the fixed plant, such as exhausters, condensers, washers, scrubbers? No, certainly. On storage capacity? Yes, possibly, a trifle less holder room, proportionate to the make, would be needed. That even is questionable. I do not advise such close sailing as some clever managers, who profess themselves content with two-thirds, or three-quarters of a day's storage. Give yourselves good elbow-room in this respect, and you will not only work cheaper, but you will sleep all the sounder for it at night—no small matter in these days of stress. It is sometimes claimed that there is a saving as regards the size of the mains in proportion to the consumption. But that is not so. Day consumption always overlaps the night consumption,

more or less; and when it does so for however short a time, the mains must be of a size to meet both consumptions.

"Increase the day-load by all legitimate means; but do not follow the example of the electricians, who make a fetish of it—as they are almost compelled to do by the circumstances of their case. Some of them sell their current for use in the day-time at a positive loss (and I observe a tendency in the same direction among gas authorities), thus involving themselves in difficulties from which they will hardly emerge with credit. The day-load, desirable enough, is not of such tremendous import to the gas manager as it is to the electrician, by reason of his being able to store the day's make. It is this valuable capability of storage, so enabling him to utilize the whole of his producing plant during the daytime, which gives the gas manager marked advantage over the electrician. The latter has no means of storage, except to a very limited and imperfect extent; and so not only his mains (as in the gas manager's case), but also his producing machinery, or the bulk of it, in the absence of a day-load, is lying idle for, on the average, half the twenty-four hours. This offers an excuse for, if it is not a justification of, his frantic efforts to secure a full day-load by hook or crook.

"I cannot accept the dictum of some, that if (there is much virtue in an "if") all the consumers were twenty-four hours' consumers, no holder storage would be required, unless they will, while using the argument, undertake a revision of the Solar System, and so reconstruct it that there shall be, instead of a diurnal period of darkness, a twenty-four-hours' day-light. It is evident (to me at least) that where there is a large number of twenty-four hours' consumers—say, one-half of the whole—there must be a corresponding increase of storage room. If the argument of these gentlemen is right, the opposite should be the fact; and if they acted on the strength of their argument and curtailed the storage by reason of one-half of their consumers being twenty-four hours' consumers, they would soon be found praying that these twenty-fours' men would cease their consumption during the time of darkness, so as to prevent the grounding of the curtailed gasholders."

> "Yes, but the storage is required by reason of the night consumers coming in at dark."

"That is only partially true. It is because of the conjoint consumption of the two under the conditions of our Planet—the one just as much as the other. It is evident (to me again) that, assuming the twenty-four hours' consumers did cease to consume when day-light disappeared, less storage room would be required than if both the night and the day consumers pursued their consumption conjointly.

"But let us turn the table, and take stock of the rights and wrongs of the question from another point of view. Here, again, my contention holds good. Supposing that you were blest with a full day-load, and deprived of your night-load, in what predicament would your day-loaders be? They would, of course, have to bear the full burden of the fixed expenses, just as the night-loaders have done from the beginning; so that it is only by reason of the night and light consumers bearing the burden that the others can be relieved, as is sometimes proposed.

"It is commonly assumed that the lighting consumers make use of gas during only the hours of darkness in the evening. This is far from being the fact. There is in all considerable towns a large consumption of gas in the daytime in dingy offices, in the back part of shops, in staircases, and in cellars and basements; and, as we all know, there is often in foggy weather an uninterrupted burning of gas during the whole day. In addition to these, a consumption by no means small takes place in the daytime in winter in the warming of rooms by lighted jets. If it were possible to allot the consumption of gas in the daytime to the different consumers, it would be found that a large proportion of it is due to those who use gas in the way that I have named. All this is ignored by those who coddle the special day-consumer in the matter of price.

"It stirs one's gorge to see these extravagant reductions made to certain favoured consumers for what they call trade purposes—as if the light used by shopkeepers and by a hundred others was not for trade purposes. I should like to know the composition of some of the boards and councils (especially in small towns) who vote these extravagant variations in price. It is simply, so far as it goes, a way of trading on other people's money. If consumers generally were alive to their interests, they would join in protest. Unfortunately, when they do attempt to criticize gas administration, their strictures are often ludicrously wide of the mark, and applied to the wrong persons—which is a pity."

> "But what about winter consumers who do not consume gas in summer? Are not the all-the-year-round consumers of more value to you than these?"

"Yes, truly; but the consumption of the first being limited to the dark months of the year is a good reason for refusing such consumers an excessive discount. It is no reason at all for allowing an exorbitant reduction in price to the other. But, mind you, it is not entirely disadvantageous to have these winter consumers. In the absence of their consumption in summer, the manager is enabled to put his set-down plant in good order. Again, with nothing but all-day and all-the-year-round consumers (assuming that such a thing were feasible), he would need a considerable surplus of carbonizing and other plant, even if he required less holder room."

> "When all is said and done, we sell at a reasonable price to the ordinary consumers, and therefore no harm results."

"The price ceases to be reasonable to the ordinary consumers whenever another obtains a supply at a figure that does not pay its way to the last penny of dividend."

> "But the mains are standing idle, or partially idle, during the daytime; and we want to employ them more fully."

"So does every sensible manager. But notwithstanding that they are idle, or partially so, the ordinary consumers provide the profit which pays the full interest or dividend upon the capital invested in the mains that are lying idle in the daytime."

> "If we refuse to supply the would-be suction-gas consumers at their price, we shall lose their custom and any profit arising from it."

"That is to say you will lose the chance of supplying the would-be suction-gas consumers at a loss, which loss would have to be recouped by keeping up the price to ordinary consumers. You might even have to raise the price to ordinary consumers, though it is possible that the natural growth of the consumption would soon obviate this—and then there is the reserve fund to fall back on, which fund has also been provided by the ordinary consumers, except where it has been accumulated under the sliding-scale. But you would certainly lay a tax on the ordinary consumers by your inability to reduce the price to them, owing to your taking on other consumers who do not pay their way.

"Assuming, for the moment, that by so reducing the price of gas to an unpayable extent—that is, to an extent that would not cover interest on money and dividend as well as working expenses—you secured all the would-be suction-gas consumers, and by so doing added, say, 50 per cent. to the consumption (the principle is the same whether 1 per cent. or 100 per cent.), it is clear that an increase of capital on additional plant would have to take place. Seeing, then, that the low price proposed to be charged would not pay interest, or only a part of it, on the capital, even if it covered the working expenses, the burden of paying such interest in full would again fall on the ordinary consumers, and their prospect of a reduction in the price of gas would be indefinitely removed. Where is the justice of such a proceeding?

"If you are determined to make these unfair reductions, might I suggest that, instead of thus taxing the ordinary consumer, you meet the difficulty by sacrificing part of the profits? It is not right to throw the onus of providing the whole of the profit or dividend on the shoulders of the ordinary consumers, under the circumstances named. If you forfeit profit to retain the custom of the would-be suction-gas consumers, then you ought to be prepared to sacrifice dividend accordingly, and not compel the ordinary consumers to make up what you lose by so doing."

But I need not pursue the conversation further. Turn it and twist it as you will, I say that to make these gross distinctions among consumers is bad policy. The casuistical arguments that are used to justify these reductions at the expense of others are based on false premises, and are injurious to gas progress. But it is sheer waste of words declaiming against the illogical arguments that are started like so many hares across one's path—or, rather, it would be a waste, were it not that their authors deceive others as well as themselves. It is also folly discussing these hairs-breadth differences between the various classes of gas consumers—something can always be said for and against any of them. But they are all interdependent; and he is wise who advocates a uniform price all round, with, as I have said, a moderate discount upon a large consumption.

I am far from wishing to under-rate the threatened or actual competition of the suction-gas plant. On the contrary, I believe that, for industrial purposes, it has come to stay. It is one of the cleverest and simplest inventions of recent years. It will be a greater competitor of electric lighting works and steam-engine works than of gas-works. The invention is not only good in itself, but it will exert a stimulus on coal-gas enterprise. The facts may be faced by far-seeing managers without flinching, though listening to some of the discussions that have recently taken place on the subject one can only conclude that not a little hysterical talk is being indulged in. One manager believes that coal gas will have to be sold at 1s. per 1000 cubic feet to compete with suction gas; and he would be prepared to supply at this price rather than miss the order, in the hope of ultimately benefiting by retaining the business. I suppose that, to be logical, he would even sell at 9d. or 6d. per 1000 feet, if these prices were required in competition.

Well, all I say is that I would not follow that example—unless, indeed, like our friend Carr, at Widnes, I could do it without putting a disability upon someone else. (Happy man, my old *protégé* Mr. Carr to-day, with no fear of the competition of suction gas before his eyes. Verily, patient persistence in well-doing is having its reward!) The ordinary consumers—in the case of gas undertakings belonging to local authorities—have all these years been milked to provide the big balances of profit that go in reduction of rates, besides contributing towards redeeming the capital within a given number of years; and now it is being proposed that they shall be further mulcted to aid in the competition against this blithe newcomer, suction gas.

Reduce, if it be possible, but not at another's expense. It never seems to occur to those companies and local authorities who allow

or are prepared to allow the extravagant reductions in question to forego (as I have already suggested) a portion of their profits by a corresponding reduction all round, so as not to allow the burden to press upon the regular ordinary consumers. What is sauce for a goose is sauce for a gander. The usual excuse is not satisfactory—viz., that they are anxious to secure custom and circumvent an opponent with a view to future advantage. It is easy to put on a bold front and adventure something at another's expense. The notion is, apparently, to reduce the price as a temporary expedient, in the hope that the higher price may be restored at some vague, future time. The idea is fallacious. Once a reduction, always a reduction. Attempt to restore the price, and the suction-gas plant will be dangled over your head more furiously than ever.

In the case of works the price of whose gas is comparatively low—say, about 2s. and under per 1000 cubic feet—there is a chance of competing without doing injustice to other consumers. But gas-works belonging to either companies or local authorities where the price from various causes is bound to be higher, may be considered out of the running; and these must be content to find that they cannot compete under present circumstances with suction-producer gas. As a rule, however, such works are not called upon to compete. Certainly, they would not improve their position by attempting it. If they did make such a reduction as would secure the possible suction-gas consumers, the result would be to stereotype the higher prices charged to the great bulk of the existing consumers, unless the works happened to be in a rapidly developing district.

One further point. A concern—especailly a small concern—takes considerable risk in supplying (that is, in providing the capital to supply) a few very large consumers. In the event of these ceasing their custom, the gas authorities would be placed in severe straits. This element of risk should not be ignored in settling the price to be charged. In the light of this consideration, it is plain that very large consumers are not the safest and most desirable customers, but that a number of smaller consumers give greater stability to a concern. This is no fanciful and far-fetched example. I have in my mind the circumstances of an actual case that occurred, where a company, having provided the necessary plant, were landed in sore straits by the defection of their largest consumer. I know of another case in a maritime town, where a Government Department hold the whip *in terrorem* over the concern that supplies the dockyards with gas, by threatening to manufacture their own light if certain unreasonable terms as to price are not conceded.

There are other substantial considerations that should weigh in settling the question of price. It may well be remembered that the ordinary lighting consumers have been the very sheet-anchor and mainstay of gas enterprise. It was on them that the strong foundation of the business was laid; and (leaving out of account the very smallest consumers) they are the Atlas that really bears the superstructure to-day. Taking them in the mass throughout the country, their consumption of the chief commodity in which you deal far outstrips in quantity that of consumers of the same commodity for other purposes. Do not overlook the fact that the lighting consumers are the backbone of your business, and let them have the full benefit whenever a reduction in price can be made. It should never be forgotten that the competition with electricity in dwelling-houses, shops, and other business premises is persistent and insidious in its growth; and the aim of every gas manager should be to meet this competition with a reduced price for gas to all consumers alike.

Of course, if you cast every argument to the winds, and still determine to pursue a policy of unfair reduction to one section of the consumers, which means the continuance of unfair inflation to the other sections, I have nothing more to say, excepting that your policy will sooner or later find its Nemesis.

Finally, let me add that the extension of gas consumption by cheapening cost under good management, by the removal of every hindrance to its universal use for cooking and heating, a reduction in the illuminating power to cheapen production, and, concurrently therewith, the widest possible use of the incandescent mantle, will go far towards enabling the gas manager (provided he is not unduly hampered) to compete against his rivals without doing injustice to any section of the consumers. These are almost common-places to urge to-day, but nevertheless he is a wise manager who treats them as essentials.

Discussion.

The PRESIDENT, in opening the discussion, said there was plenty of material before the members to discuss, as Mr. Newbigging's paper and his own address took different sides on the same subject.

Mr. J. W. MORRISON (Sheffield) thanked Mr. Newbigging for his paper, which had been doubly interesting to him, because he thought the slight conversation he had had with him a few weeks ago formed its chief topic. He referred to his own Company supplying gas for power purposes at 1s. 2d. per 1000 cubic feet. At this rate, he would like to point out to Mr. Newbigging that they obtained a very good profit, which went to reduce the price of gas to the ordinary consumer. If Mr. Newbigging referred to the published tables, he would find that they required about 7¾d. per 1000 cubic feet of gas sold to pay their maximum dividend; and as their average selling price was now practically 1s. 4½d. per 1000 cubic feet, with a maximum price of 1s. 6d., it was clear that if they sold gas for power at 1s. 2d. they had a profit of between 4d. and 5d. per 1000 cubic feet, which went towards reducing the profit that would have to be made from the ordinary consumer. But there were other towns which apparently sold gas for power at less than cost price. As an instance of this, he would refer to a large provincial city which sold gas at 2s. 6d. per 1000 cubic feet to the ordinary consumer, and at 1s. 6d. for power; whereas their gross profit in the last published return was only 11·94d. These figures tended to show that gas-engines earned nothing at all towards the profit. For 28 years Sheffield had supplied gas at varying rates—giving the largest consumers the benefit according to their annual consumption. For the half year ending June last, out of a total sale of 2714 million cubic feet, his town had supplied 228 millions for engines at 1s. 2d.; 190 millions for public lighting, at 1s. 2d.; 175 millions, at 1s. 2d., to consumers taking over 6 millions per annum; 500 millions, at 1s. 4d., to consumers taking between 500,000 and 6 millions; and 1621 millions, or rather more than half the total quantity, to general consumers, at 1s. 6d. With gas at 1s. 6d. per 1000 cubic feet, it was equal to 55 feet for 1d., which, consumed in a Welsbach "C" burner, gave 50 to 60 candle power for 15 hours for 1d. He maintained that there were good and valid reasons why the suppliers of gas should make a substantial reduction for power purposes over those who only used it for lighting. Firstly, the consumption of gas for power was pretty well the same in the summer as in the winter—*i.e.*, about 75 per cent. of the year in daylight hours, and out of the other 25 per cent. only about one-fifth was during hours that could be called night consumption, and this over-lapping could generally be met by a little extra pressure in the mains for the time being. In Sheffield, the day consumption was five-twelfths of the total. Therefore, he maintained that it was a right policy to sell to power consumers at a slight reduction. Secondly, it was by these means that they could obtain and retain customers in competition with their friends the electricians, who, of course, as it was, took a lot of consumption from them, because there were people who would have electric light even if it were double the cost. Thirdly, this policy enabled them to meet suction gas on an equal footing. He was sorry that Mr. Newbigging's "gorge" had been stirred at suppliers selling gas for power purposes at so low a price—in fact, that gentleman had as much as told him that he ought next to give the gas away with a pound of tea. It should be the aim of every gas manager to sell his product at the lowest possible price consistent with paying all expenses; and it was only by working in this direction that the gas industry could hold its own against all comers.

Mr. J. H. BREARLEY (Longwood) considered it would be better to keep the discussion as far as possible in proper chronological order. The President's address was delivered as far back as February last; and it had not yet been discussed. He proposed, therefore, first to discuss the President's address, and then deal with Mr. Newbigging's paper. One must heartily congratulate their esteemed President on the presentation of such valuable figures as appeared in his address, and upon his courage in laying these figures open for discussion, containing, as they did, the recital of a policy in fixing the price of gas so drastically different from anything hitherto attempted in that direction. It had yet to be proved that this new policy was an erroneous one. The President's analysis of the consumption under various heads revealed one important lesson—that it was possible, under certain conditions of consumption, to make, store, and distribute gas, including standing charges, interest and sinking-fund, and cost of manufacture, at a figure not far removed from 1s. per 1000 cubic feet. For his own edification, he had accepted the President's figures as to the cost in interest, sinking-fund, and standing charges of certain classes of consumers for industrial loads, which he classified as doublers, hatters, &c., in the table annexed to his address. In the case of doublers, this total inclusive figure was about 3d. per 1000 cubic feet, and to this he had added Longwood figures for cost of coals, purification, carbonizing wages, and repairs of works, less residuals, as actually in 1904, with the difference that he took repairs of works at a figure of 3d. per 1000 cubic feet, which brought out the total cost of making gas to 7·496d. This showed that certain consumers with Longwood manufacturing cost, Stockport standing charges, &c., did not incur, including interest and sinking-fund, a greater cost in manufacture than 1s. per 1000 cubic feet. If the President's deductions were correct, therefore, the possibility of gas undertakings manufacturing and distributing coal gas for power purposes at Mr. Dugald Clerk's figure of 1s. per 1000 cubic feet was not quite so hopeless as a superficial consideration of the matter would appear to indicate. One great argument which was advanced in favour of producer and suction plants was that, with regularity of load, capital and maintenance charges were very small indeed. The President showed that this argument applied with equal force to coal gas supply. In his paper bearing upon this question, their venerable friend Mr. Newbigging—and anything he had to say upon the subject was entitled to the greatest possible respect and consideration—said: "The price ceases to be reasonable to the ordinary consumers whenever another obtains the supply at a figure that does not pay its way to the last penny of dividend." Granting this, was it not still possible, as shown by Mr. Meunier's figures, to make very substantial concessions to industrial consumers, and still comply with this condition? Why should a consumer whose total standing

charges and interest and sinking fund charges amounted only to two or three coppers, be called upon to subsidize the consumer whose standing charges ran to as many shillings? They would all agree with Mr. Newbigging that the works should be maintained for the benefit of the public who were gas consumers; but it need not necessarily be a violation of this axiom to, at the same time, hold the scales of justice equitably between consumers who earned them large profits, and those consumers who, by a rough-and-ready system of charging, might incur a loss upon the undertakings they represented. In most cases at present, these, the industrial, the most valuable class of consumers, were having to stand more than their share of capital charges, which was just as unfair as making the general body of consumers pay a higher price in order that rates might be relieved, or, to quote Mr. Newbigging's phrase, "that a kind of buffer may be provided to mitigate the blows that would otherwise fall with greater force from civic blunders, extravagances, and misdirected ambitions." One would like to ask the President whether he had found any friction to arise on his differential method of charging. To a man of commercial instincts the figures might be convincing; but the consumer knew little or nothing of standing charges, or interest and sinking-fund charges. Would he be content to accept a discount of 4d. per 1000 cubic feet when his neighbour, who took no more gas but consumed with greater regularity, got a discount of 10d., even though both were using gas-engines? Possibly with his system the President might have cases where a man with a large engine paid more than a neighbour with a small one, and less consumption. The President had told them that, in making such radical changes, one had to move slowly; but one could imagine their friend Mr. Newbigging making the remark *sotto voce* that the Stockport departure was rather the speed of the powerful motor car than that of the old-fashioned tandem. For years electrical undertakings had charged in many cases less than one-fifth of the lighting charge for power; and though it might be, as Mr. Newbigging put it, "owing to the circumstances of their case," yet it did not seem, when a careful analysis was made of the cost of production for gas used for a long number of hours industrially, that they could go a considerable way further without infringing any of the sound axioms which Mr. Newbigging had laid down. He (Mr. Brearley) had heard rumours of one corporation electrical undertaking proposing to adopt a scale for power running down to $\frac{5}{8}$d. per unit—a proposal which seemed to emphasize the straits to which they had been driven in the endeavour to get power consumption. One was inclined to disagree with Mr. Newbigging when he said that on retorts, purifiers, and fixed plant, such as exhausters, condensers, washers, scrubbers, &c., there was no less capital expenditure for industrial consumers. Upon this point he should have something to say on a future occasion; but at present he would content himself with remarking that he was not quite in agreement with it. There was a freshness and vigour in everything that Mr. Newbigging wrote. He ventured to think the paper Mr. Newbigging had read that day would take no small part in guiding, not only the members of the Institution, but the ranks of the profession outside, to a reasonable conclusion as to what was to be done to meet competition, whether it was from suction plant or any other direction.

Mr. H. E. Mottram (Ossett) said he was afraid it might seem presumptuous on his part to discuss a paper by Mr. Newbigging, a gentleman whom for the past twenty-one years he had looked up to as the absolute authority on all gas matters. But as he (Mr. Mottram) was one of those who had done everything that Mr. Newbigging told them in his paper they ought not to do, he would like to say a few words in defence. When he read through the paper, he thought theory was perfect; but he had gone dead-against theory, and had found practice more perfect in his case. He said in his case, because no doubt theory would hold good in many instances. When he took charge at Ossett four years ago, the Corporation had just bought out the Company; and the costs on the then output pointed to a probable loss of about £2000 a year. He was, however, glad to say they had not had a loss. They had supplied and fixed engines, cookers, slot fittings, &c., and had given discounts of from 5 to 25 per cent., and had thus greatly increased their consumption and paid their way. This had not been done at the expense of their lighting consumers, because they had at the same time reduced the price to them 3d. per 1000 cubic feet. If they had not done what it was said they ought not to do, they would have had to put up the price to the lighting consumers, instead of down, to meet the loss. He did not agree with the all-one-price argument. They were often told to run their gas-works as a trading concern; but the grocer and the draper did not sell their goods all at one price. They would give a discount on taking a quantity; and this was what the public were being educated up to. They liked it, and did not grumble; but what would the public say if they kept working at a loss, or put up the price? They would want them to wake up, and run on business lines, in the way they were accustomed to. He had no doubt that Mr. Newbigging would tell him Nemesis would soon overtake him; but he had a plant largely in excess of his maximum daily output, so that before she came along he hoped to have found other means of dealing with her.

Mr. W. Whatmough (Heywood) said one of the points in the President's address deserved the consideration of the Institution, and that was with reference to rateable value. Those who had seen the table submitted by the President when he gave his address, would have noticed the very great variation there was in the proportion of rateable value. In item No. 31, the cost was given as 1·68d., as against 11·28d. in No. 13. This showed a difference of 9·6d., which was a very large variation indeed. This was, of course, common knowledge. "Field's Analysis" showed the same variation; and he thought they, as an Institution, ought not to keep discussing these matters from time to time, but should deal with the question in practical shape. He ventured to suggest, therefore, that the Parliamentary Committee of the Gas Institution, if there was such a body, ought to take the matter into their consideration, to bring about a system of valuation of gas-works so that all rating should be equal. He thought this was a matter that should not be neglected. There was another point the President referred to—namely, income-tax. He said that the income-tax on profits ought to be handed over in relief of the rates. In his case, they had the tax allowed from profits transferred to the district fund, and then credited to gas. With reference to the paper submitted by Mr. Newbigging that afternoon, he thought he had missed the principle of differential rates. Once this principle was admitted, however small it might be, he thought to a certain extent he should be in accord with charging on a differential basis. But he thought, when Mr. Newbigging said that, now that they were fast approaching to universal incandescent lighting, they should be able to supply gas cheaper, he himself would admit that, rather than lose a customer, it would be better to make a little sacrifice now, and when they were in a position to reduce their charges to keep that customer rather than lose him. In his case, the consumption had not been increased for the last five years. They had a 30 per cent. margin of retort power, and had had a very strong fight indeed with electricity. In a case where they had a good margin, it was better to make a little sacrifice now than lose a customer altogether, because he (Mr. Whatmough) found, taking their fixed charges, compared with being without power consumption altogether, it made a difference of 3·4d.

Mr. H. Townsend (Wakefield) said that, in his opinion, Mr. Newbigging's paper had come at a very opportune time, and, read in conjunction with the President's excellent address, it gave them a capital insight into both sides of an important question. Both the President's address and Mr. Newbigging's paper would well repay the members for all the consideration they gave to them. A great many companies at the present moment were debarred by the trend of legislation from carrying out the policy suggested by the President. Parliament had now decided, in a good many recent cases, upon allowing only 15 per cent. reduction for industrial or any other purposes of that description. Some interesting articles had appeared recently on this topic in the "Journal of Gas Lighting." At the present moment, many gas undertakings were combining to approach Parliament with a view to getting the legislation with regard to sulphur impurities altered. Whatever conclusion might be come to as to the proper course to pursue with regard to supplying gas for industrial purposes, there could be no question that the industry would be benefited by having these anomalous restrictions removed. The electric lighting industry had perfect freedom. They sold for industrial purposes at 20 per cent. only of their lighting prices, and he thought one of the speakers had said that a very much larger reduction was contemplated. If this course was fair for their chief competitor—the electric light—it ought to be permitted to them. He observed that the President had allowed discounts on supplies for industrial purposes up to 10d. per 1000 cubic feet, and that the reduction had cost, or threatened to cost, £1800 a year. He should very much like the President to give them the results of his experience on this matter gained since he read his address. If they could be informed whether the consumers had been content with the privileges granted to them, and whether the step taken had shown quite satisfactory results, it would help them all very much in coming to a right decision on this very important question.

Mr. C. Elliott (Leyland) agreed with the conclusions arrived at by Mr. Newbigging. He had been supplying gas for power at 2s. 4d. per 1000 cubic feet, and a would-be consumer of gas for this purpose wanted to set up a 17-horse power engine; but the suction people approached him, and guaranteed to supply his engine through a producer so that he would have his power at 0·1d. per horse power. At the rate at which he could supply—viz., 2s. 4d. per 1000 feet—it would work out at $\frac{1}{2}$d. per horse power. In order to compete successfully with suction gas, he would have to reduce the price of his gas to the lowest figure Mr. Newbigging mentioned in his paper—6d. per 1000 feet. There would be no sense in pursuing business on the lines of reducing from 2s. 4d. to 6d.; but this was what he would have to do to get this customer's business. He thought they truckled too much to the large consumer. In similar districts to his own, the mills were supplied with gas at a great reduction; and a friend of his had told him that the large millowners were the most exacting customers one could have. They came and took their consumption at a very awkward time; and then in the summer they discarded gas altogether, and the plant was lying idle to serve them just when they required gas. They got too much reduction, and too much consideration. To give an instance of what he had been saying, a new shed had been built in his neighbourhood, and the owner told him he was lighting it up on the incandescent system. He was putting one light for four looms—equal to 1 cubic foot of gas for each loom, whereas under the old system it took 3 feet for

each loom. If the price were to be reduced to a consumer of this description, they would soon get into trouble. As he had said, too much consideration was shown to the large consumer; the average consumer ought to be more thought of.

Mr. Isaac Carr (Widnes) wished to express his gratification to his old friend and former chief for his very kindly and complimentary references to himself. He agreed in the main with the contentions which Mr. Newbigging set forth, which he understood to be that it was not right or fair to sell gas for any purpose below cost price. At Widnes, they were sailing very near to it in selling gas for motive purposes at 1s. per 1000 cubic feet; but still even then they had a profit which went to swell the balance at the end of the year. All the gas they sold was disposed of at a profit. He hoped to have due regard to this in the future, and to continue on the same lines. In any further reductions they made, they must always leave a margin of profit. There was one part of the paper which no one had yet touched upon. He supposed this was because all were in agreement with it; but he could not say that this was his feeling. He referred to the proposal to reduce the illuminating quality of the gas. He would like the author, or anyone else, to tell him what, or how, he could gain, either for himself or his consumer, by following such a policy. At the present time at Widnes, they were enriching the gas to the extent of 2 candles beyond what the ordinary coal gave them. This enrichment cost 1d. per 1000 cubic feet. If he were to follow on the lines of the "new" gas, as some people termed it, it would be right to give the consumer this 1d. off the price, which he could well afford to do. But he considered this would be placing the consumer in a worse position. It was better for the consumer to have the pennyworth of enrichment in the form of 2 candles than it would be to give him even 2d. off the price of his gas. He should not think of descending to the stage that was suggested by some eminent engineers—of altering the quality of the gas to 13, 12, or even 11 or 10 candles. He was a seeker after truth in this matter at present, and failed to see what was to be gained by it. On the contrary, he foresaw that great injury would arise, and that it would play enormously into the hands of their various competitors. Enrichment was never so cheap in the history of gas lighting as it was to-day; and it was an article of commerce that it was good for them to deal in. In his opinion, to advocate and practise the manufacture of low-grade gas was a highly retrograde step; and he was unable to understand how it could do good to anyone to adopt it. He would be told that everybody must use incandescent mantles; but this did not meet his argument at all. The incandescent burner man, the gas-cooker, the gas-fire, and the gas-engine man were all equal sufferers; and the flat-flame burner was the greatest sufferer of all. If he had no flat-flame burners to provide for, he would still pursue his course of enriching and giving an equal quality of gas to all.

Mr. A. E. Buckley (Holmfirth) asked if anyone knew of a corporation or a company who sold gas at a loss. He thought that Mr. Newbigging's excellent paper should be regarded more in the light of a warning than as finding fault with anything that had been done. In his own district, unfortunately, he had been invaded by the suction-gas plant, and still more was likely to come. His Company had quite recently been waited upon by four of the largest gas-engine users, who threatened that if they did not reduce the price of gas they would discontinue their custom and go to suction gas, which would mean a decrease in consumption of 1¾ millions. Such cases as this must be dealt with on their merits; and they should not lose such customers by refusing to reduce the price when they could afford to do it. In his case, fortunately, they could afford to make a reduction. About five years ago, he laid a main ¾ mile in length, for the sole purpose of supplying a gas-engine (which was still running) belonging to one of the consumers who had threatened to leave them. He was the only consumer on this length of main. He would like to ask Mr. Newbigging what he was to do in such a case as that. There was sufficient gas made in his district to supply all the consumers, whether for lighting or heating purposes generally. In conclusion, he thanked Mr. Newbigging for the warning he had given.

Mr. T. Berridge (Leamington) said he had all his life been greatly indebted to Mr. Newbigging for his valuable books. He was disposed to agree with Mr. Morrison that sometimes reductions were necessary. It had been suggested that they should move in the direction of the Gas Companies' Protection Association to rid themselves of the sulphur clauses. At the same time, they should consider whether they could not get discounts allowed, so that they might have a free hand, the same as the electric light companies had. Many companies had a clause to the effect that they must not sell to anybody at a less price than they charged for the public lamps.

Mr. H. Kendrick (Stretford) said, like many of his friends, he had had a go in for differential prices, but could not see his way to go as far as either the President or Mr. Newbigging. He thought the President's address was unique in the annals of that or any other District Institution, and opened up a large number of fields for thought and investigation. His suggestion as to the larger gas-works undertaking coal-testing for the smaller ones was well worth their attention, and would add to the knowledge of coals by the testing-works. This, however, would apply only to nuts or screened coals, and unscreened of the harder varieties; unscreened and slack would still have to be tested in bulk before one could arrive at a satisfactory conclusion. The suggestion as to averaging prices was, he thought, outside the range of practical politics, although such an arrangement, if possible, would be beneficial. Separate papers could easily be written on the other topics mentioned, which were approached with a freshness that was invigorating. Time would not allow him to deal with each separate subject; and he would, therefore, accordingly pass to the one burning question before them at that moment—the price of gas to power users. After listening to the masterly criticism of their veteran member, he (Mr. Kendrick) felt somewhat like a pigmy following a giant. But having arrived at a somewhat similar conclusion by a much shorter and probably not so logical a course, he felt compelled to raise his voice and protest against the attempt to kill the goose that laid the golden eggs—the particular goose in this case being the middle-class lighting consumer, who, as Mr. Newbigging stated, would, if every gas manager followed the advice of their President, pay the dividends due to their shareholders on the low-priced gas. As one of those following the President's lead up to a certain point, he wished to explain his position. The Company he represented had, on his recommendation, made reductions in price to large consumers, and more reductions still to power consumers, not with the idea of fighting suction gas, as at present they were not face to face with this, but as an act of justice to the larger and continuous consumers of gas. The prices of his Company were 2s. 6d., 2s. 5d., and 2s. 4d. per 1000 feet for lighting, and 2s. 3d., 2s. 2d., and 2s. 1d. for power. He arrived at these figures by two methods. First, as to power, the greater part of this gas was used during daylight hours; only in the winter did the power and lighting supply overlap, and any shortage in the mains area for the short time—namely, 4 to 5.30 p.m.—could be met by an increased pressure for that period. "Mill pressure" was not an unknown term in cotton towns. The extra pressure required was very little, as the full lighting demand was not reached, even in December, until about 6 p.m., as neither suburban shops nor houses were fully lighted up until the warehouses were closed and the people reached home. The overlapping, therefore, was strictly limited, and need not affect the size of mains, which would still be regulated by the lighting demand as from 6 to 8 p.m. The capital expenditure for trunk mains for this gas was therefore *nil*. There was a saving in gasholders and governors, though not to the extent claimed by the President. Meters were not proportionately so expensive; and there was a reduction in the repairs and working expenses due to the larger demand. This he made to be equal to 3d. per 1000 cubic feet; and they made this the minimum reduction. The other factor in the sliding-scale adopted was in connection with distribution charges and management expenses. But, here again, he did not go so far as the President, who worked out the costs as though part of these charges had no bearing on the cost of manufacture and capital expenditure. Taking such items as clerks' salaries, directors' fees, incidentals, stationery, &c., he ventured to say they were much more fairly charged to manufacture than distribution, or that, at all events, only a small proportion should be debited to distribution. The establishment charges due to the consumption of gas, as distinct from manufacture and the extension of business, were collectors' and inspectors' salaries, a portion only of the office expenses, and so much of the out-door expenses as was due to the repairs of mains, meters, and services. When this item was satisfactorily settled, he was of opinion that it would not be more than three-fifths of the two divisions of their revenue account—distribution and management. It should be divided by the number of consumers, when they would obtain approximately the amount that each consumer cost the company for maintenance, collection, and inspection, which were the only items affected. The maintenance of mains, service-pipes, and meters was complicated by the sizes, and would have to be adjusted later on. The figure now arrived at was divided by the consumption per annum; and the product was the cost per 1000 cubic feet of each consumer, according to quantity. The difference between the two extremes, as would be seen later on, was, however, still so great that his Board could not see their way to split up the consumers into small groups, but contented themselves with making three groups in each division, and, after adjusting for maintenance, arrived at the scale before mentioned, which he thought was fair and equitable, and was quite as far as they were at present justified in going. In his own particular case, after allowing for residuals and a fair sum spent on reconstruction of works, the gas cost them something slightly over 11d. per 1000 cubic feet into the holder. The interest on capital expenditure, which worked out very similar to the last item on the first table in the President's address, the working hours being so much smaller, he had taken at 5·4d. Then they had to divide up the standing charges. The total standing charges of his Company worked out to a little over 7d. per 1000 cubic feet. Four-ninths of this was due to the outstanding charges, which should be divided *pro rata* between the consumers; the remainder being due to the works, which should be divided *pro rata* according to the facts. The difference was 3·3d.; and this he had added to his sales cost. The cost for the particular consumer he was considering worked out very low—12·062d. For the very lowest, 10,000 cubic feet per annum, it was 14·46d.; and for the highest, the 20 million cubic feet one, it worked out to 0·01d. He had taken the average from 10,000 up to 100,000, then up to 500,000 cubic feet per annum, and then from 1 million up to 20 millions. For these three cases, the average worked out at 4·82d., 0·48d.,

and 0·04d. In this way he had arrived at a figure of 20·4d., instead of going on Mr. Meunier's figure of 17·16d. But what would this drive them to, if, as Mr. Newbigging suggested, the day-load became equal to the night-load? Instead of being satisfied with a 10 to 15 per cent. margin in winter, they would be compelled to increase their carbonizing plant, so as to leave a margin of from 30 to 40 per cent., in order to carry on repairs. They now worked with a minimum of spare room. As the members would know, in the summer they would have ample opportunity of repairing and overhauling; but with an equal day and night load this could not be done. All the plant would have to be split up into small units, with one extra unit in case of breakdown. This would increase the President's capital charges by at least 50 per cent., and, on his own showing, place them outside in the race for power-gas supply. He (Mr. Kendrick), for one, could not see his way to enter into the competition in prices, and saddle the lighting consumer with additional charges when they had to fight electricity at the other end of the scale. A company felt this competition more than a corporation did, and must look after their interests as best they could; and these were to foster the consumption of lighting gas first. There were special reasons why, in the area of his Company, they did not feel the pinch of competition so keenly as it was felt in manufacturing towns, so as to be driven to try desperate remedies in a despairing attempt to obtain what was in many cases beyond their reach. His district was very largely residential. The manufacturing part was quite new, and formed a fringe. At present, it was only 12 per cent. of their total output; the remainder being to a considerable extent a lighting demand, though both heating and cooking by gas were greatly on the increase. They were, therefore, of opinion, that it would be bad policy to reduce the price to their power consumers at the expense of their lighting consumers, who were their mainstay. If two of his power consumers threw him over, the gas sold by his Company for power purposes would be reduced to 4 per cent. of their total; and as no consideration of price would keep these two, if they could get or make gas cheaper, it was false policy to supply it at a lower price and lose on it, as he had shown they could not make it themselves at the price and supply them.

Mr. NEWBIGGING, in reply, said it would not be necessary to take up much of the time of the meeting, because it would be seen that even those who had disagreed with some of his arguments would be found, when what they had said was considered, to be, after all, really in fair agreement with him. Some said, "Reduce the price of gas when you can afford to do it." If they only did it when they could afford to do it, he had nothing to say against that. He asked Mr. Mottram what his price was.

Mr. MOTTRAM replied that it was 2s. 9d.

Mr. NEWBIGGING said, of course, if they followed the example of Mr. Mottram, and made heavy reductions to certain favoured consumers, they would undoubtedly increase the consumption. But the point was, Would it enable them to give an equitable reduction in price to the ordinary consumers? He (Mr. Newbigging) said no—it was impossible. Mr. Mottram said he had been able to reduce 3d. per 1000 in the course of four years by pursuing the policy he advocated. In reply, he (Mr. Newbigging) said that any general reduction he had been able to make had been made in spite of this policy; and the reason must be found elsewhere. It might be owing to the improvement in trade, or because his was a rapidly developing town and district. The reason he gave was an impossible one. Then, with regard to Mr. Morrison, he should place him in the same category as Mr. Carr. The highest price Mr. Morrison charged was 1s. 6d. per 1000 cubic feet; and he said he could afford to supply gas for power consumption at 1s. 2d., and still pay his way. Mr. Morrison must not run away with the idea that he (Mr. Newbigging) was criticizing him. He held that gentleman's management and the administration of his Directors in every respect. But there were numbers of other managers who could do quite as well as Mr. Morrison, if they were not hampered. The fact was that they were hampered; their hands were tied behind their backs, and they had to knuckle down, so that they could not reduce the price as they ought to do. Mr. Brearley had made some very kind references to him; and he did not know that he had any criticism to offer on anything he had said. That gentleman had stated that he was keeping something in pickle for him. He supposed that this would be in his Presidential Address next year; and therefore he would wait for that. He wished Mr. Carr would tell him a secret, and that was how he managed to make gas and sell it at 1s. per 1000 cubic feet and cover his working expenses. He had never been able to get at the bottom of that secret. Mr. Carr had done it for years, and it was no use to cavil at it, because the fact remained that he did it. He was sure that if Mr. Carr, instead of enriching nowadays, were to push the incandescent mantle to the utmost, it would be far preferable; and he would be forced to do it in the long run. It was perfect folly to enrich now. Then Mr. Buckley also agreed with him. He gave them an instance of a long length of main he had with at the end of it only one consumer, who was threatening to cease taking a supply, if he did not get a reduction in price. All he (Mr. Newbigging) could say was that Mr. Buckley ought to have had an agreement, when he laid the main, that this consumer should continue at a fixed price.

Mr. BUCKLEY remarked that there was an agreement, but that it had just expired.

Mr. NEWBIGGING said this only bore out what he had said, that a large consumer was not always an advantage. He knew of a case where one ruined a small company. They could not pay any dividend because this consumer withdrew his custom, and took to electric lighting. Instead of charging a low price to this gentleman who was the sole consumer at the end of a long main, Mr. Buckley should put him something on, taking into account the risk. In his opinion, reductions were always a mistake. It should be remembered that, at whatever price the consumer got his gas, he had value for his money. He would not occupy their time with vain repetitions, but would ask them to take his paper, and place alongside it the contentions they had heard put forward that day, and judge for themselves which would best hold water. He would like, before sitting down, to allude to a paper that had appeared that week in the "JOURNAL OF GAS LIGHTING," written by Mr. Forstall, of New York, because it was well worth reading. He did not think Mr. Forstall could hide so much humour under his very serious mask. It was so seldom that anything really funny appeared in the gas periodicals, that a little humour—even humour in disguise—to stir the risible faculty came as a welcome change. He would like to describe Mr. Forstall's paper a little, because there was no doubt they would hear more of it, as there was such a convincing sound about it. It was on the question of charging for gas; and his scheme was a revival, with garnishing, of the old and nearly played-out farce of charging meter-rents, which was an item in the gas-bill that the consumer always looked upon with disgust. Mr. Forstall had revived this, with variations and additions. Not only would he restore the meter-rent, but he would add to it other rent-charges—for manufacturing plant, for mains, for service maintenance, keeping ledgers, and "heaven knew what else." The scheme—which was a brilliant one, if it could be carried out—was this: A consumer of less than 1000 cubic feet had to pay $5 (equal to a guinea) for 1000 cubic feet of gas. If he happened to consume no gas at all, he would still be called upon to pay 12s. 6d. The author justified this by charging for all the things he had enumerated, such as the meter-rent, the mains rent, the maintenance rent, and the keeping of ledgers rent; and it all amounted to 12s. 6d., if one consumed no gas at all. Now, a nice little income could be made in this way, provided one could find a sufficient number of simpletons who would contribute to it by paying 12s. 6d. A larger consumer obtained his gas for $1·75 (equal to 7s. 3d.) per 1000 cubic feet. Quoting Mr. Forstall's own words, he said: "As, under this scheme, the price paid is reduced as the consumption increases, you need only consume a large quantity of gas to pay nothing at all." In this way, who knew but that the company might run in debt to the consumer? He was dwelling on this matter a little because they would hear more about it. There were so many millionaires in the States, and the folks there were so familiar with very big things—such as trusts, "corners," and the like—that even a poor consumer of only 1000 cubic feet of gas in the year thought nothing of a few dollars, and was not only willing but eager to pay a guinea for that quantity in order that the big consumer might get his reduction in the price. Mr. Forstall had hardly taken full advantage of his opportunities. His paper should have been accompanied by an illustration or two, which might have represented the man on the first floor who burnt a lot of gas, and therefore got it very cheap, leaning out of his window wildly gesticulating, and singing a song to a man down in the cellar who paid $5 per 1000; and the song might possibly have ended with the well-known refrain: "Pay! Pay! Pay!" He did not think Mr. Forstall's scheme, even in the States, would oil the gas machine; on the contrary, he would find that oil would supplant his gas to a very marked extent. Joking apart, there was one feature of the scheme which was sensible. It was only for quantity consumed that Mr. Forstall would make a reduction, and not because this one or the other was a heating or a cooking consumer, or a lighting, a trade, a night, or a 24-hours consumer. What perfect folly it was to parcel out the consumers in this way. Why should Mr. Forstall so attenuate a scheme which had a basis of good in it as to strain the very vitals out of it with these ridiculous proposals? It should be a matter of indifference to a gas seller what his customer intended to do with the commodity he sold to him. They did not concern themselves with what the purchaser of their coke, or the tar contractor or the ammoniacal liquor buyer, was going to do with it when he had bought it. Why, therefore, should they make an exception in the case of gas? They sold their gas to the consumers, and they could do anything they liked with it—they could light a church or a mill—so long as they could pay for it. There was no logical connection at all between the purchasing and the using of a thing, except in the case of a chemist, who, if he sold a poison without putting a red label on it, was liable to suffer. There was one point he expected the members would have touched upon in answer to him. Some of his friends, when discussing this subject with him and among themselves, had said that in a matter of this kind one could not have perfect consistency. He agreed with that to a certain extent. For instance, one might reasonably allow a discount to a customer on taking a quantity. The retort might be made to him: "What quantity?" and he would be asked if he would fix one. He would reply that one could not do so; everybody must do it for himself. They must look at their customers relatively, as they might have some using up to millions in a quarter. He could not fix the point at which they should begin and at which

they should cease allowing a discount for quantity. They must be content with a rough-and-ready basis. It was said that some of the smallest consumers scarcely paid their way. He hardly agreed with that. With abstruse calculations, they could make figures prove almost anything; but he would say, in the exercise of this rough-and-ready justice—blind justice, he might call it—do not be hard on the very small consumers. Most of them could only afford to be very small consumers; and the price charged to them, based upon some of the calculations he had seen—remembering again that figures would prove anything—would be something akin to cruelty. He had recently seen it reported that at a certain place they were selling gas to small consumers at 2s. 8d., whereas they ought to be charged 3s., to make the concern pay its way. But he did not believe anything of the kind. If the thing were looked into, it would be seen this was a fallacy.

The PRESIDENT said he did not intend to take up much time in replying to the small amount of criticism that had been made on his address. Mr. Brearley had asked whether any friction was likely to arise by adopting a system of differential discounts. Friction did arise to some slight extent, until the consumer was shown the why and the wherefore of the difference in the discount, and then he began to look at it from their point of view as well as from his own, and came to the conclusion that it was perfectly fair. The difference of 10d. per 1000 cubic feet seemed to be a great deal; but they did not deal out "blind justice," as had just been recommended, by saying, "Irrespective of whether you are a good or a bad consumer, for that particular class of usage you shall have a discount of 10d. per 1000 cubic feet." As Mr. Newbigging had said, figures could be made to prove anything; but figures also showed one many things, if they were carefully and also intelligently applied with the object of ascertaining exactly one's position. This being so, in order to induce the poor consumer to become a better one, the discount, instead of being 3d. per 1000 feet all round to everyone, was increased rateably, with the possibility of it becoming 10d. He was perfectly in accord with Mr. Newbigging when he said they had no right to sell gas at a loss. The least they ought to sell at was at absolute cost, but never below this. Mr. Townsend had reminded them that companies were not allowed by their Acts of Parliament to make these large discounts. This might be an answer to a great deal that had been stated. It showed that the reason why they were restricted was due to the fact that originally, when these Acts were granted, gas was practically a monopoly, and was used for nothing else but lighting. It was before the day of the gas-engine or of the heating furnace. In those days, what was used for heating was used through an ordinary jet, and was very small in quantity. The consumers being all alike (the only difference being in the quantity they consumed), and their hours of consumption being practically the same, there was no necessity then for the differences in price which to-day were part and parcel of what they had to face, and what they would have to look at carefully and intelligently, especially from the point of view of their own local circumstances. This, in his opinion, was why the Acts of Parliament were framed as they were, and he was quite in accord with Mr. Townsend when he said that somebody—preferably the Institution of Gas Engineers—should move in the matter and point out to Parliament the difference between the present-day consumption and the competition they had to deal with, and the consumption and competition when the Acts were passed. Competition was getting greater and greater every day. There were more ways of carrying out the work which was originally done by gas alone; and if they did not cope with the competition, they would have to go to the wall. Mr. Townsend had asked him with regard to his experiences since he read his address, as to whether the reduction of 10d. per 1000 cubic feet would show a loss. He could not answer this from the absolute figures, because the items of discount in their accounts all showed discounts for payments for a certain period. They had not differentiated between the absolute industrial consumer and the ordinary consumer, between the two figures. Whether it was due to the differential discount for industrial purposes or not, there might be one or two other reasons why their figures should have been affected, though he certainly thought the differential discounts must have had an effect on their consumption this year. During the latter part of last year, the percentage of increase had been greater than they had ever known it before. From April 1 up to the present day, there had been an average of 11 per cent. throughout the period. If this went on, it would be very exceptional. As a rule, the increase had been about 4 to 5 per cent. per annum; and never had they experienced such an enormous jump as had occurred in the last twelve months. He did not claim that the increase was altogether due to the differential discount, as they had had improved trade, which, no doubt, might have had some effect. He did not think that the differential discount had told its tale in the way of increasing the sales of gas. Mr. Elliott referred to the possibility of having to sell gas at 6d. per 1000 cubic feet. He should like to draw that gentleman's attention to the fact that 0·1d. per horse power, which was the equivalent of 6d. per 1000 cubic feet, might be obtained by working the engine at full power. If they took the ordinary methods of using the gas-engine either by suction gas or by the ordinary town gas, he thought they would find they could not obtain a horse power for 0·1d. He had intended to give some facts with regard to the cost of suction gas; and though there had been some specially interesting papers read before the Institution of Mechanical Engineers, giving the facts from their standpoint as to the consumption of anthracite coal and coke necessary to obtain so much horse power per hour, and deducing from the figures the cost at which coal gas would have to be sold in order to compete, he ventured to think these figures were very flattering to the suction gas people, but were certainly not figures that they would have to face in competition. It had fallen to his lot some little time ago to go carefully through the cost of installing suction gas for something like 170-horse power. He had to work it out with a gentleman, arriving at the equivalent cost in coal gas, to enable that gentleman to work it at as economical a rate as he could with his own suction-gas plant. Taking into consideration every item that he could possibly think of, he found it would cost, with the suction-gas plant, the equivalent of 1s. 2d. per 1000 feet of coal gas. This he ventured to suggest was a sound working figure—one they need not beat round the bush for; but it was entirely wrong to talk about 9d. or 8d. per 1000 cubic feet to compete with suction-gas plant. With regard to Mr. Kendrick's remarks, that gentleman's district was chiefly residential; and the class of consumer he supplied was one, it would be noticed, that was put in the tables appended to his address as showing good profits. It was a good class, and a long-hour load consumer. He would repeat that, in making a calculation to arrive at the cost, undoubtedly the number of hours over which the consumption was spread must be seriously taken into consideration. Public lighting was nearly always charged for at the lowest figure; but still the public lighting-load was a very sound load. It was practically 4000 hours a year; and a customer consuming for 4000 hours a year was a good one, whom it was cheap to manufacture for, and cheap to distribute to. The nearer they could approach to this class of consumer, the cheaper they could sell at. As to mill consumption, he was altogether opposed to Mr. Newbigging's argument that they should give discounts on quantities, never mind what was done with the gas. If they lost 6d. per 1000 cubic feet on the lighting when the mill was standing for nine months in the year, and only taking three months' consumption, the increase in the quantity did not minimize the loss. Personally, he should never attempt to stop a large cotton-mill putting down their own electric lighting. He would rather welcome it than otherwise, because it would mean that their plant would last so much longer, and it would save them the necessity of extending. Mr. Newbigging's argument of discounts for large quantities was not so sound as it appeared. If travellers were employed to sell an article of commerce, and sales were considerably less than the manufacture, the manufacturer simply stored, if he could. If the travellers were kept up to their "cake and milk," and were getting out their orders, the manufacturer was working at an even output per day, and could afford to sell large quantities at a lower price than small. But did that argument hold good with regard to the manufacture of gas? He had shown by his figures that, putting ample on one side to keep ahead of repairs and to take up the various portions that were breaking down, keeping them all in good working order, the plant they had was capable of manufacturing twice as much gas per annum as they were actually doing. In most towns, the difference between night and day consumption was getting less. They did not have the same margin of difference; and this, no doubt, was due to the increase of heating stoves. That was one class of consumption which was entitled to have consideration, and in respect of which there should be a reduction in price. He ventured to think that their policy would have to be altered; but, as he said in February, these changes must be made slowly. He did not expect—and certainly would not advise—that discounts should be made until they had the money available to give them. When they had £3000 per annum which they could give to their customers, then they could begin to find out which of the consumers were the most deserving to receive it. They made 1s. per 1000 cubic feet profit out of some consumers, while out of others they might be making 1s. per 1000 feet loss. Was it right to make a reduction of 5d. per 1000 feet all round, or was it fair to let the consumer gradually come back, at any rate, to the cost price, or should they give the advantage to the man who had been making their dividends? His figures would have to be taken as applying each to himself in his own local circumstances, because according to the district so would they vary. But he had thrown them open for discussion with a view to finding out whether his premises were wrong or right. He still ventured to think that the ideas on which his tables were based, and the figures as they stood, pointed out the correct principles to be adopted in arriving at the cost.

The following letter has since been forwarded for publication by Mr. Newbigging:—

To the Editor of the "JOURNAL OF GAS LIGHTING."

THE PRICE OF GAS.

SIR,—We were so pressed for time at the meeting of the Manchester District Institution on Saturday afternoon last, that I had to hurry rapidly through my remarks on the various opinions expressed by speakers in the discussion on my paper. I was desirous of saying something more on the question of the day-load, and the stress which is laid on the fact that the mains are lying partially idle during the daylight hours. Very much is made of this by those who favour heavy reductions in price to those who

are called "consumers of gas for trade purposes," overlooking the circumstance, which I pointed out in my paper, that, although the mains are partially idle during the day, the profit that is obtained from the ordinary consumer pays the full interest on the capital expended on such mains.

Keep your minds easy, you Director and you Committee-man. It is a regrettable fact, no doubt, that these mains are far from being employed to their full capacity during the daytime; but the poor obliging "goose"—the ordinary consumer—who lays the golden eggs, has made it all right for you. You shall not suffer in pocket so long as he is there. This is comforting for Mr. Director and Mr. Committee-man; and one would think they would feel grateful, and act just as though they felt grateful. So some of them do. But others only take advantage of the poor goose's complacency, and so they reason, "That being so, we will call in another class of consumers who sadly want gas at a lower price; and as the interest is already being paid on these mains, and all the fixed charges in addition, we will give the newcomers the advantage they ask for, and charge them so much less for their gas."

And there is no relief for the poor obliging goose, who goes on paying as before. What a goose he is to be sure! Oh, responds someone, "yours is an old-fashioned policy." To that I answer: "To do right between man and man can never be an out-of-date policy. It would be a misfortune if it were." There is in it that which gives it eternal youth.

Manchester, Nov. 27, 1905. THOMAS NEWBIGGING.

THE QUESTION BOX AND MR. KENDRICK'S PAPER.

On the suggestion of the President, these were taken as read; and the discussion on them was adjourned to the next meeting.

[See pp. 615 and 617.]

REPORT OF THE SCRUTINEERS.

The report of the Scrutineers showed that the ballot for the election of office-bearers for the ensuing year had resulted as follows:—

President.—Mr. J. H. Brearley (Longwood).
Senior Vice-President.—Mr. W. Prince (Stoke-upon-Trent).
Junior Vice-President.—Mr. J. Timmins (Wigan).
Treasurer.—Mr. T. Newbigging (Manchester).
Secretary.—Mr. H. Kendrick (Stretford).
Committee.—Messrs. T. Duxbury (Oldham), Geo. Niven (Cleckheaton), and W. Whatmough (Heywood).
Auditors.—Mr. C. Elliott (Leyland) and Mr. J. E. Lamb (Altrincham).

The following new members were elected: Mr. Edward Allen (Liverpool); Mr. W. Baillie (Penistone); Mr. J. Bond (Southport); Mr. Walter Hill (Sandbach); Mr. P. Lancashire (New Mills); Mr. H. Pickford (Farnworth); Mr. E. A. Sainsbury (Holywell); and Mr. G. W. Tooley (Manchester).

VOTE OF THANKS.

Mr. J. H. CROWTHER (Wallasey) proposed a vote of thanks to Mr. Newbigging for his paper, which, he said, embodied the enthusiasm of youth, and was characteristic of the reader's caution. He could sincerely propose this vote, as he was in hearty accord with Mr. Newbigging's conclusions. That gentleman was not going to spend his money in finding out how much reduction the consumer ought to have, and then, after he had paid his money to his clerks, &c., find that no reduction ought to be given; neither was he going to allow a corporation to make such large profits in aid of the rates that anyone could easily compete with them with his own plant.

Mr. W. S. HADDOCK (Warrington), in seconding, said it was always a pleasure to have a paper from Mr. Newbigging.

The motion having been carried unanimously,

Mr. NEWBIGGING thanked the members for their kind and unanimous vote of thanks. It would always give him pleasure, as long as he lived, to do what he could for the Institution.

Producing Mixtures of Coal Gas and Water Gas.—A patent has been taken out by M. Rummens for a gas-furnace having multiple vertical retorts for the simultaneous production and admixture of coal gas and water gas. Several retorts are grouped together in one setting, and heated by means of one or more generators operating by natural draught. Each retort has double walls, the exterior one having parallel sides, while the interior one, which is provided with vertical slots to allow the gas to pass off without ascending through the hot coal, is of conical form, to facilitate the discharge of the coke. Under each retort is a closed chamber, into which the coke falls, and which encloses a vaporizer heated by the coke, and designed to generate sufficient steam for the production of a limited proportion of water gas. The vaporizer consists of three vertical concentric tubes surrounding a rod, which may be used as a poker. Water is admitted into the annular spaces between the tubes; and the steam produced is led up into the retorts.

WHICH IS THE BEST TYPE OF SETTING FOR SMALL GAS-WORKS?

This question has been discussed in the light of the knowledge gained in the erection and supervision of working of a large number of gas-works of small and moderate size by Herr F. Francke, of the well-known firm of Constructing Engineers, Messrs. Carl Francke, of Bremen. This Company and a combination of two or three other German firms are largely responsible for gas-works having been erected in recent years in a large number of the small towns of Germany and the neighbouring countries. These towns, frequently of only 2000 to 3000 inhabitants, would, but for the technical supervision and financial assistance which the firms named are able to offer, have remained for many years without gas-works or any central lighting station. We hope shortly to give some details of the extension of gas supply which has thus been effected; but in the meantime the views of Herr F. Francke on the most advantageous form of setting for small works should be of interest. They are abstracted from a paper which he read in September before a meeting at Oldenburg of the Association of Gas and Water Engineers of Lower Saxony. The paper has been published *in extenso* in the "Journal für Gasbeleuchtung."

The view has been expressed by Schäfer, in his work on the construction and working of small gas-works, that for works with an output not exceeding 17½ million cubic feet per annum direct firing is the only practicable mode of heating the retorts, as it is less troublesome than the semi or full producer setting. This view, however, is no longer tenable, as will be demonstrated in the sequel. The question whether the semi or full producer is to be preferred ought also to be considered; but at the outset it may be admitted that full producer firing is only admissible when the setting will be always worked at its full load.

Producer firing, when properly handled, unquestionably gives more favourable results than direct firing; but it is more sensitive and much more troublesome to manage. On this account, chiefly, Schäfer has condemned it for small works. The difficulty, however, which he had in mind, of obtaining a sufficiently well trained staff for such works, no longer obtains in Saxony—thanks in no small measure to the gas foremen's training school started by the local Technical Association. At this school at Bremen, great importance is attached to education in the management of settings with producer firing, and those who have passed through it are quite equal to the subsequent tending or controlling of a semi or full producer setting. These trained men are to be had at the same salary as applicants for the positions who are without such training. Thus the better results of producer as compared with direct firing are obtainable without any increase being made in the wages sheet.

In works of small or moderate size, even when the number of retorts in a bed has been fixed most judiciously, having regard to the output at different seasons, occasions will arise when a bed of retorts will not be wholly charged. To meet this contingency with the greatest economy of fuel, a bed of retorts which is most capable of accommodating itself to the varying output is essential—that is to say, a bed which is as simple as possible in working. A good semi-producer setting possesses this qualification in the highest degree. Some settings of this class behave, under certain conditions of working, like direct-fired settings; and this probably accounts for their want of susceptibility to differences in working. With direct firing, the coke burns on the grate to produce carbonic acid, and the hot products of combustion play round the retorts and convey to them the necessary heat for carbonizing the coal. With producer firing, however, three phases in the combustion may be distinguished; and they may be regarded as occurring independently and in sequence.

The first phase comprises the combustion of all coke to carbonic acid; then, in the so-called neutral zone, the second phase occurs, and the carbonic acid is reduced to carbonic oxide; while the third phase covers the admission of the secondary air and the combustion in the retort-chamber of the carbonic oxide to carbonic acid. Thus the producer affords first of all a fuel gas, which then burns in a flood of flame in the retort-chamber. The producer firing thereby admits of the highest temperature being reached almost at any desired spot in the retort-chamber, instead of merely a little above the grate as with direct firing. Genuine producer settings may be defined as those in which the producer effects as complete a reduction as possible of the carbonic acid to carbonic oxide, so that only the latter practically passes into the retort-chamber; while semi-producer settings are those in which the reduction is less complete, and substantial quantities of carbonic acid pass into the retort-chamber. The economically better working, attended with greater sensitiveness, of the producer setting is thus accounted for. The genuine producer presents a complex process, requiring watching; but it makes it possible to liberate the heat exactly where it is required.

If, however, the fuel is burnt away in a producer until its depth does not exceed about 30 inches, its top is then at about the level where the neutral zone should be, and the semi-producer will become for the time being a direct fire. The setting would suffer in efficiency, but become less sensitive. Thus a semi-producer can be left a long time without attention, and the temperature will not appreciably fall off. The length of time will vary according

to the depth of the producer, or it will coincide with the time occupied for the fuel to burn from its maximum height of 48 to 63 inches down to a depth of 20 to 32 inches above the grate. With such a bed of fuel, the setting will keep its temperature throughout the night without any recharging of the producer; and wages for night work may thereby be saved. There is, however, a practical limit to the increase of depth of the fuel bed for small works; for though a deep producer answers better than a shallow one when in full work, a shallow producer gives better results when it is being only partly utilized.

A setting which accommodates itself to a variable output, and with little attention varies as little as possible in temperature, is most suitable for small works. It is wrong to judge a setting for such works with varying make by the results of a trial run at maximum load. Such a trial is of little value in any gas-works which has a smaller output than 17½ million cubic feet per annum. The better plan is to make three trials, as follows, showing: (1) The fuel consumed with the maximum output of which the bed is capable. (2) The fuel consumption, and the frequency of clinkering and charging the producer, when the output of the bed is at half its maximum. (3) The same data for the smallest output of the bed, which should, however, not be less than about 30 per cent. of the maximum per retort. The setting which comes out best from such an ordeal is a semi-producer, with a fuel bed about 4 feet to 6 feet deep. There are several firms in Germany which erect such settings, scarcely more sensitive than with direct furnaces, and giving considerably more favourable results than the latter at full, half, and one-third load.

To illustrate the foregoing contention, the results may be compared for settings of four retorts with semi-producer and direct firing. As a general rule, direct firing consumes on the average 3 per cent. more in fuel. Under quite unfavourable conditions the setting of four might be in use only for 150 days in the year, and in that time average only three-fifths its maximum productive capacity. Taking the latter at 7940 cubic feet per retort per diem, the setting would average 19,060 cubic feet per diem; and the coal carbonized would be about 1·8 tons. A saving of 3 per cent. of the weight of coal carbonized in the coke consumed for heating the setting amounts to 8·1 tons for the 150 days, or (say) £7 10s. But during at least 90 days all night work could be avoided, and wages amounting to about £12 10s. thereby saved. With direct firing, the shallow bed of fuel would burn through in a few hours and need replenishing at night. Thus about £20 per annum would be saved by the semi-producer setting, representing, at 20 per cent. for amortization and repairs and 5 per cent. for interest, a capital value of £80 as the sum by which the cost of the setting might be allowed to exceed that of a direct-fired setting. A semi-producer setting of four retorts, with a depth of about 4 feet below the stage, costs at the most £300, including ironwork and hydraulic main, and is 10 to 20 per cent. dearer than a direct-fired setting. Thus there is a difference of £20 to £50 in favour of the semi-producer.

The following actual results for a setting of three retorts at the Aumund-Fähr Gas-Works show the utility of semi-producer firing in small works. During the 35 days from July 3 to Aug. 5, the make averaged 14,055 cubic feet per twenty-four hours; the coke averaged 62·2 per cent., and the consumption of coke in the producer 31·6 per cent. of the weight of the coal carbonized. There was only one stoker, who was on the works from 6 a.m. to 6 or 7 p.m. The consumption of coke was not underestimated nor its make overestimated, as the foreman was anxious to show a surplus at stocktaking. The maximum capacity of the setting was afterwards determined in a three days' run by one of the staff of the Bremen Gas-Works. The make averaged 27,580 cubic feet in twenty-four hours, the yield of coke was 73 per cent., and the fuel consumption 22·1 per cent. Thus during the 35 days the setting was only worked to about half its capacity. Yet relatively good average results were attained.

It is important that the Associations of Gas Managers should take up more than they have hitherto done such questions in relation to quite small gas-works. It is natural that gas manufacturing problems should be dealt with mainly in their bearing on large works, where savings of small percentages in working make up a substantial total in the year. But the consideration of similar questions in respect of smaller works should make the latter more profitable, and give an incentive to the construction of such works. The advent of a gas-works in a small place is economically an advance of inestimable importance; and it would therefore be most advantageous to have more systematic and generally applicable information as to the requirements of small gas-works than has hitherto been available.

Masonic.—At last Wednesday's meeting of the "Evening Star" Lodge, No. 1719, Bro. F. W. Cross, the Engineer and Manager of the Lea Bridge District Gas Company, was elected W.M. for 1906, in succession to W. Bro. C. H. Nicholson; and W. Bro. T. H. Martin, of New Barnet, was re-elected Treasurer.—On Friday, at Manchester, W. Bro. S. R. Ogden, P.M. of the Fidelity Lodge, No. 269 (Engineer and Manager of the Blackburn Corporation Gas-Works), was elected W.M. of the Northern Star Lodge, No. 3053, in succession to W. Bro. R. G. Shadbolt, whose term of office as Master of the lodge expires in February. Bro. Harrison Veevers was reappointed Treasurer.

SOCIETY OF BRITISH GAS INDUSTRIES.

The Society Started.

The Meeting convened for last Thursday, at the Holborn Restaurant, by the Committee appointed in February last to consider the question of forming a Society constituted of contractors and manufacturers to the gas industry, was attended by a representative number of gentlemen, including the whole of the members of the Committee; and the outcome of the meeting is that the Society has been formed, and that next January or February will witness the first meeting.

Report and Objects of the Society.

The report which the Committee presented, and the draft of the objects and rules of the Society, were unanimously adopted; but there will probably be some slight amplifications of the rules to be submitted at the next meeting.

The report of the Committee was as follows:—

The Committee appointed by the Gas-Works Contractors, &c., at the Holborn Restaurant meeting, in February last, to examine the suggestion of forming an Institution of Gas-Works Contractors and Manufacturers, to set forth the benefits of such an Institution, and to frame the main rules for its guidance, has carried out its instructions, and begs to append its report, together with the proposed principal rules and objects of the Society.

The members of the Committee desire, in the first place, to refer to the success which has attended organizations of a somewhat kindred character, notably the following: The Engineering Employers' Federation, the Iron and Steel Institute, and the Electrical Manufacturers' Association; and they venture to hope that a like success will attend the formation of a similar Society in the Gas Industry.

Your Committee has considered very carefully a title for the suggested Institution; and as the latter is not to be essentially a scientific body, nor has it in any sense the elements of a "ring" in it, the words "Institution" and "Association" have both been discarded, and the title thought to be most appropriate is the "Society of British Gas Industries."

It has long been felt by many influential firms engaged in the industries connected with the manufacture of gas plant and distributing appliances, that a Society of such manufacturers would be helpful in bringing its members together, and giving to their part of the industry a recognized standing and influence.

It is to be distinctly understood that the proposed Society of British Gas Industries is in no way antagonistic to the Institution of Gas Engineers, but is rather to work in conjunction with that Institution for the advancement of the gas industry as a whole, thereby securing its highest interests.

It may perhaps be advanced as an argument against the forming of the proposed Society at the present juncture that there is an absence of what might be termed a question of supreme importance to the whole industry; but your Committee contends that it is sounder policy to form a Society before such a question arises than to wait and make the advent of that question the main reason for forming a Society.

Had such a question arisen at the present time, the important body of contractors would have had no voice in the matter, and your Committee believes that this state of affairs should be rectified.

The objects of the Society are:

1. To promote and protect the interests of Gas-Works Contractors and Manufacturers.
2. To promote the consideration and discussion of all questions affecting Gas-Works Contractors and Manufacturers, and generally to watch over and protect the interests of such persons.
3. To give the Legislature and Public Bodies and others facilities for conferring with, and ascertaining the views of, persons engaged in the gas industries as regards matters directly or indirectly affecting those trades.
4. To confer with Government, Municipal and Local Authorities, and Public Bodies generally, in regard to matters affecting the gas industries.
5. To originate and promote improvements in the law, and to support or oppose alterations therein, and to effect improvements in administration.
6. To diffuse among its members information on all matters affecting the gas industries.
7. To provide for, and be a central medium of, useful or confidential information, available for members of the Society.
8. To obtain more favourable terms and rates from railway companies and shipping companies and other carriers for the conveyance of goods.
9. To promote just and honourable practice in the conduct of business, and to suppress malpractice.
10. To arrange and promote the adoption of equitable forms of contracts and other documents used in the gas industries, and to encourage the settlement of disputes by arbitration, and to act as, or nominate, arbitrators and umpires in such cases and on such terms as may seem expedient.
11. In the interests of the gas industry generally, to arrange conditions with promoters of exhibitions, and to select jurors and reporters who command the confidence of exhibitors.
12. To establish, subsidize, promote, or co-operate with any Associations with objects similar to those of the Society.
13. To establish, administer, and contribute to any charitable or benevolent fund.
14. To provide facilities for social intercourse between the members of the Society and their friends.

15. The Society shall not impose on its members, or support with its funds or otherwise, or attempt to procure, the observance by the members of any regulation or restriction which, if an object of the Society, would make it a Trade Union.

EXTRACTS FROM THE CHAIRMAN'S ADDRESS.

In presenting the foregoing report and objects (with the draft of the rules),

The CHAIRMAN (Mr. Charles Clare) briefly addressed those present. In his preliminary remarks, he brought to mind that it was exactly twelve months since that the idea was mooted as to the advisability of forming the Society. Continuing he said: It may perhaps be useful to revert for a minute or two to the Earl's Court Gas Exhibition of last year. The Institution of Gas Engineers considered that it would be advisable to hold an Exhibition, which they hoped would be fairly representative of the gas industry at that time. In order to do this, they appointed a firm experienced in the promotion of Exhibitions, through whom the invitations to the contractors and manufacturers were issued. During the progress of the Exhibition, it was felt by some that, great as it was, it would have been even greater had there been some central authority among the contractors and manufacturers whom the Institution of Gas Engineers might have approached direct, instead of having to carry out their wishes by the aid of parties who at that time were known little of by the industry at large. It was also felt that firms who went to such great expense as those present did to make a memorable and historic exhibition, should have more control over financial arrangements than was possible under existing circumstances; and, further—if, as was only too probable, that Exhibition was to be the forerunner of similar ones throughout the British Isles—it would be advisable that some such central authority should be called into being. It also seemed to some that, probably owing to the want of such an authority, the great and important body of contractors and manufacturers who had done so much towards the advancement of the gas industry were without a recognized position in that industry; and we do not think that anyone really wishes such a state of things to continue. There was one thing very noticeable about the Earl's Court Exhibition, and that was the good fellowship and friendly feeling that existed generally not only between members of different sections of manufacture, but even between members who were perhaps rivals. This fact also appeared to show that great benefits might be derived by the industry as a whole from more opportunities for friendly intercourse under the auspices of a recognized guiding authority. In addition to this, the number of Junior Institutions of Gas Engineers had not to be lost sight of, and the fact that, at some future date, it might be of the highest welfare to the entire industry that those engineers and the present junior contractors and manufacturers should be able to show a united front. The last Exhibition may perhaps have curbed some little aggressiveness on the part of our electric light competitors, and showed the strength of a united gas industry; and it may be that that strength will be required to be shown in greater degree in time to come. The formation of such a Society as we indicate to you may be a means to that end. Well, the position now is very much what it was a year ago. True, we have no large exhibitions, but there are plans being made for future ones, in which no doubt the same financial questions will occur. In the present case, there is no question of the right of the different sections of this industry to form a Society which shall be an advantage to the industry at large, and therefore an advantage to those firms severally who join it. It is, we think, a question of expediency as to whether the present time is the proper one for forming it. You will no doubt remember that, in our report, we say we think it advisable not to wait till any question of supreme importance to the whole of the industry occurs, but to take steps now while we have plain sailing before us. You are no doubt acquainted with the objects of the proposed Society; and it may seem to some of you that we are trying to bring the millennium a step nearer. This—however praiseworthy it might be—was not what we had in view when drawing up the objects; but we certainly did think it was better to aim high, and endeavour to ensure that the Society should be based on principles which, if carried out in their entirety, would make the gas industry, as a whole, a pattern for every other. Certain objects may appeal with greater force to some sections than to others; but we are sure that the main object of endeavouring to advance this great industry in a just and honourable manner, and of trying to promote goodwill and fellowship between its various sections, will appeal to you all. Turning to the proposed rules, the absence of any allusion to a President may have struck you; but your Committee suggest that the presidency should be the greatest honour that the Society has in its power to bestow, and that it could be given to anybody, whether connected with the industry or not, whom the Society would like to single out for such honour. It would, therefore, be apart from any voice in the management of the Society, and would leave the management entirely in the hands of the Central Council. The President should be elected annually. You will notice that it is suggested that full membership should be given to principals only of firms who manufacture gas plant and distribution appliances, and that, at any rate for the present, it would be advisable to limit the firms to the United Kingdom. Your Committee think it is of the highest importance that the membership should be limited in this way. Your Committee also think it advisable that Rules 10 and 12 should be very strictly adhered to.* We have now placed before you our scheme, and have endeavoured to fulfil the duty you laid on us at the commencement of the year; and, though it is far from perfect, we have honestly and conscientiously considered the whole matter, having kept in mind, to the best of our ability, the welfare of the contractors and manufacturers, and with them the welfare of the whole industry.

As stated above, the report, objects, and rules were unanimously adopted.

THE PRINCIPAL RESOLUTION.

The principal resolution passed during the proceedings was the following:—

That a Society be formed, entitled the SOCIETY OF BRITISH GAS INDUSTRIES, with objects as set forth in the circular of the 27th of October, 1905.

Subsequently, the preliminary Committee were unanimously re-elected as a Provisional Committee, to carry into effect the foregoing resolution.

Until the Central Council is elected, communications on the subject of the Society should be addressed to Mr. Charles Clare, No. 134, Queen Victoria Street, E.C.

COST OF GAS POWER.

Writing on the subject of the "Cost of Gas Power" in the "Electrical Review," Mr. G. M. Brown, of Swalwell, attacks recently published figures on the subject, and then himself puts forward the following results on defined particulars as to working and prices. He says:

If we assume that there are 3000 working hours per year, and that the average load is 22½-horse power—a condition of affairs especially favourable to the gas-engine—that the efficiency of the electric motor is 87 per cent., the gas consumption 20 cubic feet per brake-horse-power per hour for the engine working at three-quarter load, and the corresponding anthracite consumption 1·2 lbs. per brake-horse-power per hour, and that the prices of electricity, gas, and coal are respectively 1d. per unit, 2s. 6d. per 1000 cubic feet, and 22s. 6d. per ton, and make the usual allowances for interest, depreciation, attendance, and stores, we have the following results:—

COST PER BRAKE-HORSE-POWER-HOUR.

	Electric Motor.	Engine with Town Gas.	Suction Plant.
Gas, coal, or electricity.	0·856d.	0·600d.	0·145d.
Lubricant, &c.	0·015	0·060	0·073
Attendance	0·008	0·053	0·265
Maintenance	0·008	0·048	0·064
Interest and depreciation	0·046	0·192	0·367
Totals	0·993d.	0·953d.	0·914d.

The result shows a slight superiority on the part of the suction plant.

With a smaller load-factor, the superior economy of the electric motor at light loads, and the absence of all stand-by losses, would entirely alter the condition of affairs. Taking, for instance, an average output during the 3000 hours of 15 brake-horse-power, the figures are:—

Electric motor	1·003d. per B.H.P. Hour.
Gas-engine with town gas.	1·206 ,,
Suction plant	1·204 ,,

It will be seen that the cost of fuel in the case of the suction plant is a comparatively small item; and even if it were greatly reduced, the cost of power would not be influenced to any great extent.

While the writer wishes to give every credit to gas-engine makers for the highly economical performances of suction-gas plants so far as fuel consumption alone is concerned, and does not desire in any way to deny the fact that with large units it is possible to produce power at extremely low prices—lower even, taking all charges into account, than the prices at which it can be obtained in bulk from electric supply companies—he wishes to protest strongly against the unfairness of advertisement calculated to produce in the prospective power user's mind the impression that he can generate it at $\frac{1}{10}$d. per brake-horse-power per hour, inasmuch as, according to Guldner (whom gas-engine makers will, no doubt, admit to be an authority on the subject), the cost of power produced by a 200-horse power suction plant working 3000 hours per year at its *full* rated load, and taking anthracite coal at 22s. 6d. per ton, is not less than 0·357d. per brake-horse-power per hour on the engine-shaft.

* RULE 10.—No firm shall have more than one of its principals at one time as a member of the Central Council.

* RULE 12.—The subscription of two guineas shall entitle a member to belong to one section only, but he may belong to other sections on payment of a further one guinea subscription for each such section he elects to join, provided always that no person shall be elected a member of any section unless he himself manufactures, or is a principal of a firm that manufactures, articles comprised under that special section.

NOTES ON A NEW PURIFIER GRID AND PURIFYING MATERIALS.

By H. KENDRICK, of Stretford.

[A Paper presented to the Manchester District Institution of Gas Engineers, Saturday, Nov. 25.]

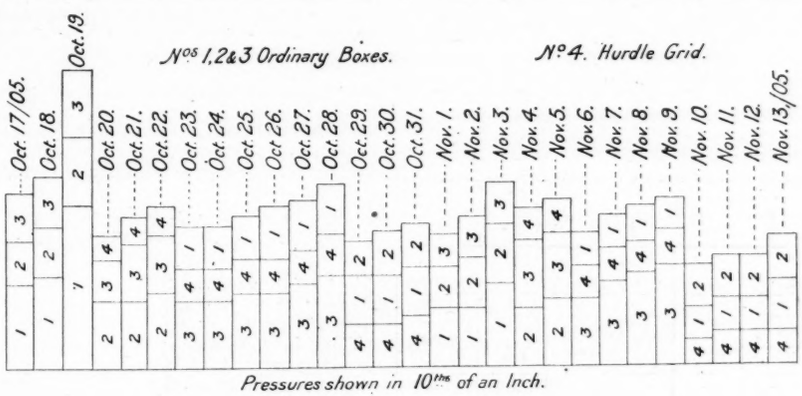
Having been favoured with an admirable paper by Mr. J. C. Belton on his experience with "Jäger" grids, the Committee asked me if I would relate my experience with "Spencer" hurdle grids; and this, after having failed to "draw" another member, I consented to do. As, however, we have only one box in operation, and that has only been working a few months, the information at my command is not so full as I could wish.

The purifier fitted with the Spencer hurdle grids is one of a set of four water lute (20 feet by 20 feet by 5 feet) boxes, worked by a centre-valve of the usual dry-faced type. They are fixed on girders with a revivifying floor underneath, are provided with bottom discharging shoots, and are fed by old bucket elevators, which discharge the oxide into shoots only 4 ft. 6 in. higher than the edge of the box-lute. This involves having a man with a rake stationed at the shoot to pull down the oxide into the skips by which it is carried and deposited in its place in the box. This arrangement will be simplified next season by carrying the elevators higher, and having the oxide distributed from a band conveyor through a canvas shoot. There are no structural alterations required to the purifiers, and the cost of a set of hurdles fixed is under £40 for a 20-feet square box.

In these boxes, the hurdles are arranged on a tier of ordinary grids 12 inches from the bottom of the box, in five rows; the two outer ones on each side being inclined from the vertical to the extent of 20°, commencing at one side with three special grids cut to suit the box and to give the desired angle. After these first three, the hurdles are all one pattern, until the opposite side of the box is reached, when three special grids are used to complete the square. For the purpose of avoiding excessive handling, the inclination of the two outer rows on the left-hand side is opposite to the inclination of the two outer rows on the right-hand side. The centre row of hurdles is dealt with differently; and, in placing in position, we start with special hurdles in the centre of the box, and place the ordinary hurdles in opposite directions until the sides are reached—using the same special grid to finish off with as in the outer rows.

The hurdles, when placed in position, entirely fill the box, with the exception of the gas-way at the bottom, and occupy a space of 4 feet from the ordinary flat grid at the bottom to the top of the lute-plate; and the box has the appearance of being filled with laths of wood. The hurdles are so constructed that a lath in one row is directly below a space in the row immediately above it, and so prevents the full pressure of the material from pressing downwards on to what I may term the floor of ordinary grids. You will see from the model that there are seven triangular laths in the depth; the space between each tier being just under 7 inches. The space from one lath to the next immediately above cannot be more than 14 inches at any time, and the pressure exerted on the material cannot be more than 14 inches. But as the purifying material shows a distinct tendency to form an arch from one horizontal lath to the next, it is practically certain that the pressure exerted on any part of the mass of material is no more than will be due to 7 inches of material between it and the next horizontal row of laths. We found the material, upon examination after filling one-half, was quite loose at the bottom of the box, as, owing to the construction, it is impossible to pack the oxide. The greatest fall the material has from one lath to the next below it being 7 inches, it must of necessity be loose. My own fear, when first filling, was that the material would not run to the bottom, and that we should have to space the hurdles farther apart; but I have to confess that my fears were groundless, as when emptying I personally examined every row, and could not find an empty space. The filling seemed perfect, as was also the sulphiding of the material.

The process of filling with us at present is to pour the oxide



from the skips on to the top of the grids, until the material is 3 inches over the top lath; and for emptying we remove the centre row of hurdles first, as the discharging shoots are situated under these near the outer edge of the box. This row of hurdles has to be taken right out of the box, as the space is required for working at the other four rows. Little difficulty is experienced in taking out the special hurdles; and after these are removed, the ordinary hurdles only require shaking slightly to loosen them. No pick has been necessary to loosen the material at any time; and it is much more easily dealt with than with the old type of grid. In removing the material from the other rows of hurdles, it is necessary to proceed rather differently; and only about one-fourth of the hurdles in these four rows are removed from the box. After this, the remainder are merely reversed and placed in position behind the men as they proceed with the emptying; so that actually only two-fifths of the hurdles have to be lifted in and out of the box each time. This will, of course, greatly reduce the wear and tear on them, which would be heavy if they all had to be lifted out and stacked each time. We found it necessary to leave plenty of room for expansion after the first time of filling; and, in addition to leaving a hurdle out of each row, we reduced the width of the centre row by 2 inches. The mass of wood absorbed so much moisture, and swelled so greatly, that it was with difficulty we removed the first few hurdles. Since leaving more room, we have not experienced any difficulty at all.

The other purifiers here have only one tier of grids in, and the oxide is placed on them in one layer 2 ft. 9 in. deep. This has been our practice from time immemorial; and as we have not been until quite lately very much troubled with back-pressure, I have not altered it. Last winter, with oxide containing over 30 per cent. of sulphur, one set of four boxes purified 850,000 cubic feet of gas per day, and gave 10½ inches back-pressure. At this stage it became troublesome; and we put the second set of four 20-feet boxes to work, when the back-pressure immediately fell to 1½ inches. So far this winter, we have not found it necessary to put the second set of boxes to work, though our make has reached 1,100,000 cubic feet per day; while the maximum back-pressure given by the three boxes filled in the ordinary way was 4·1 inches, and that given by two ordinary and the Spencer box, when the Spencer box was the middle one, was 2·1 inches, and when the Spencer box was first 1·3 inches.

The amount of material placed in the boxes was as follows—

Ordinary grids	22 tons
Spencer ,,	28 ,,

The cubic space occupied by each being—

Ordinary grids	1100 c. ft., or 50 c. ft. per ton
Spencer ,,	1700 ,, ,, 61 ,, ,,

The quantity of gas purified by the boxes per change has been—

Ordinary grids	5,752,000 cubic feet = 261,000 c. ft. per ton
Spencer ,,	8,207,000 ,, ,, = 293,000 c. ft. ,,

The labour in emptying and refilling per box has averaged—

	Emptying.	Refilling.
Ordinary grids	20 hours	35 hours
Spencer ,,	28 ,,	44 ,,

A total of 55 hours labour, including removing and refixing cover, for the purifiers with ordinary grids, and 72 hours for those with Spencer grids, which works out, per ton of material dealt with, to—

Ordinary grids $\frac{55}{22} = 2{\cdot}5$ hours

Spencer ,, $\frac{72}{28} = 2{\cdot}6$,,

or practically the same. While on the gas purified, it works out per million cubic feet—

Ordinary grids $\frac{55}{5{\cdot}752} = 9{\cdot}6$ hours

Spencer ,, $\frac{72}{8{\cdot}207} = 8{\cdot}8$,,

Therefore, though the labour costs per ton are slightly higher

owing to the handling of the grids, the labour cost per million cubic feet of gas purified shows a saving of practically 10 per cent. Where the oxide is placed in the purifiers in two or more tiers, the saving would be more. The greatest feature, however, is that with the same sized box we are enabled to purify 1,455,000 cubic feet of gas per charge, or an increase of 25 per cent., thus decreasing the capital charges for purifiers to this extent.

I have not the slightest doubt that, with all the boxes in one set converted to this system, we shall materially reduce our labour costs and increase the gas purified per box. There is, however, one doubtful point that a long experience will only prove—viz., the cost of repairing and renewing the hurdles. They are considerably more fragile than the old type of grid, and will, I am afraid, at least swallow up any saving that we may obtain in labour costs. But there will still remain, as an advantage, the absence of back-pressure and reduced capital charge.

Purifying Material.

In deciding upon the particular brand of oxide out of the many offered, it is necessary to take into consideration the cost of working, beside the usual ones of price, cost of delivery and discharging, and the percentage of moisture, organic matter, and hydrated ferric oxide. Some oxides that appear cheap because they can be delivered at a lower price than others are dear at any price, and *vice versâ*. I had an experience with a natural oxide that contained over 60 per cent. of uncombined water that I do not wish to have again. I also had an experience with an artificial oxide that would not take up sulphuretted hydrogen till it had been through the boxes once. We cured this by mixing with it about 20 per cent. of partly spent oxide.

Apart from all these, and the ease with which some oxides take up sulphuretted hydrogen, there is one that is often overlooked—namely, the cost of revivifying. Some oxides revivify very quickly, others slowly; and in order to determine which was the better for our purposes, and settle once for all the rival claims, we procured sufficient new oxide to fill two boxes prepared for use by the vendors from each of three separate firms. These different oxides were kept separate up to the time of their being spent and sold as spent oxide; and a record was kept of the gas purified, sulphur contents, and labour spent on each, with the result that we have bought the oxide that was highest in price ever since. As will be seen from the following tables, it was not even the sooner sulphided; but the advantage lay in the readiness with which its revivification took place. So rapid is this, that with new oxide it has either to be watched constantly or immediately spread out on the revivifying floor.

Table I.—*Artificial Oxide.*

Turns in Box.	Sample A. Gas Purified. Thousands of Cubic Feet.	Sample A. Percentage of Sulphur, Dry.	Sample A. Percentage of Moisture	Sample B. Gas Purified. Thousands of Cubic Feet.	Sample B. Percentage of Sulphur, Dry.	Sample B. Percentage of Moisture.
1	3,674	9·4	31·2	3,674	8·4	28·9
2	7,260	23·7	21·3	6,839	21·7	18·8
3	10,951	32·9	8·6	8,004	32·4	11·2
4	10,692	41·7	9 0	13,296	38·9	8·3
5	3,422	43·6	7·3	8,917	41·3	3·7
6	7,511	44·0	9·0	8,236	43·9	10·6
7	7,416	45 4	11·8	6,770	45·0	7·6
8	7,129	49·3	7·3	7,416	46·7	10·8
9	6,737	50·8	10·7	6,533	48·5	4·8
10	8,347	51·9	6·3	7,730	49·5	10·0
11	7,435	53·0	7·4	8,297	52·1	10·7
12	3,429	54·6	9·2	6,292	54·0	10·0
13	4,563	55·8	10·0	6,335	55·1	11·0
14	..	..	..	5,064	56·0	10·1
	91,866			103,401		
Aver.	7,067			7,386		

Table II.—*Artificial Oxide.*

	Sample C.			Sample D.		
1	2,719	26·0	21·8	1,116	18·8	33·0
2	5,619	33·7	25·1	6,890	26·9	25·0
3	10,963	37·7	20·9	11,744	34·8	15·4
4	9,933	40·4	10·4	13,441	40·9	19·3
5	2,885	42·2	13·3	9,600	41·8	11·9
6	6,397	43·9	5·4	4,739	45·7	8·3
7	2,720	47·2	10·9	3,147	46·9	10·0
8	6,257	48·9	11·4	5,885	49·3	6·5
9	3,813	49·8	10·0	8,803	51·5	11·1
10	7,416	51·0	10·1	7,579	52·4	9·0
11	11,808	52·2	8·0	8,679	53·1	10·0
12	7,463	53·4	8·2	5,680	55·0	8·8
13	5,460	54·3	8·8	4,450	56·8	8·5
14	6,641	55·8	7·0	..	..	..
	90,091			91,673		
Aver.	6,435			7,052		

Table III.—*Natural Oxide.*

	Sample E.			Sample F.		
1	10,152	21·2	38·8	9,207	27·7	34·9
2	6,680	26·6	21·2	3,979	30·1	32·4
3	12,118	34·6	21·0	8,457	35·1	14·0
4	8,643	38·0	28·7	12,062	39·8	15 4
5	4,340	41·4	20·2	6,327	42·0	10·0
6	7,576	42·6	13·2	7,790	44·4	11·0
7	7,363	45·3	14·6	11,931	47·3	7·0
8	6,126	49 6	8·1	7,050	50·2	8·2
9	6,339	51·5	7·8	7,532	52·9	6 4
10	7,148	54·1	9·0	7,391	53·6	4·4
11	6,023	56·3	8·0	6,925	56·4	6·4
12	7,538	56·8	3·3	7,979	58·7	5·6
	90,046			86,630		
Aver.	7,504			7,219		

The accuracy of the amount of gas purified per turn is somewhat interfered with by the fact that during the winter we were compelled to have two sets of oxide-boxes working in conjunction. The tests extended over a period of 22 months, and were all conducted by one of my assistants, who was responsible also for the sampling and analysis of the oxides. Both the artificial oxides contained originally 35 per cent. of moisture, and the natural oxide 45 per cent. Steam was admitted in small quantities into the gas during the winter at the scrubber outlet, to ensure the gas being moist; and 1½ per cent. of air was admitted at the condenser inlet, so that a certain amount of revivification took place in the boxes. The curious point about all the data is that, though No. I. was the least and No. III. the most active to begin with, yet all three samples reached 50 per cent. of sulphur in the same number of changes, and that the natural oxide was more active at the finish. Moisture does not seem to have assisted purification to a large extent, as witness the behaviour of the two tests of natural oxide; but when the moisture fell very low, the amount of sulphur taken up fell off also. Ten per cent. of moisture seems to be the limit. The percentages of moisture were calculated on the oxide as sulphided, not prepared for refilling; it being our practice to well saturate the oxide on the floor overnight to the extent of about 25 to 30 per cent.

The labour expended on the three samples varied considerably. The emptying and refilling of the purifiers for all the samples was the same; but the time occupied in revivifying was considerably less with sample No. I. than with either No. II. or No. III. Tabulated it is as follows:—

	Cost of 45 Tons Unloaded.	Wages Paid for Emptying and Refilling Boxes.	Wages Paid for Revivifying.	Total.
I.—	£56 5 0 ..	£32 13 8 ..	£24 10 0 ..	£113 8 8
II.—	48 7 6 ..	32 6 0 ..	44 6 4 ..	124 19 10
III.—	46 12 6 ..	30 5 0 ..	47 6 8 ..	124 4 2

The gain is not much; but the advantage must be ascertained from the amount of labour spent on the work; and, in my opinion, any material, though it costs more initially, that reduces labour on the works is a saving, as fewer men are required, and fewer men means less supervision and less wear and tear, the value of which cannot be calculated.

In placing these figures before you, I am actuated as much by a desire to gain information from my fellow members in the discussion which is to follow, as by a possibility of imparting information to any of them.

Benzol and Toluol for Driving Motor-Cars.

In the "Motor-Car Journal" for the 11th inst., there were some remarks on the subject of a new fuel for petrol-cars; and they drew from Mr. J. H. Brown, of Nottingham, an interesting letter which was noticed among the "Current Topics" in the above-named publication on Saturday. "It appears," says the writer, "that the new fuel is evidently a type of benzol which has a specific gravity of about ·883, and a flash-point of between 56 and 60." It seems that Mr. Brown has also been at work in the direction of producing a motor spirit from the bye-products of gas-works, as about eighteen months ago he made some very exhaustive experiments with benzol for use in motor-cars, and also with types of toluol, and found that either of these products will work perfectly satisfactorily alone or mixed with from 30 to 50 per cent. of petrol. Not only so, but he has made journeys of 100 to 200 miles with this product without the slightest difficulty—experience showing him that "one gallon of tar spirit is equal in mileage to at least 1⅛ gallon of ordinary petrol."

We have received from George Newnes, Limited, Part XI. of the "Technological and Scientific Dictionary" now in course of publication by them, under the editorship of Mr. G. F. Goodchild, B.A., and Mr. C. F. Tweney. It extends from "sap" to "spring," and consequently includes "screw," "screw-threads," "solutions," "spectrum," and "spectrum analysis"—subjects which interest our readers more than the majority of the others coming into this part.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS AND THE "QUESTION BOX."

At Saturday's meeting of the Manchester Institution of Gas Engineers—the proceedings at which are reported elsewhere to-day—the Secretary (Mr. H. Kendrick, of Stretford) presented the following replies to certain "Question Box" enquiries that had been circulated among the members.

Question No. 5.

Is there any type of retort-setting so constructed as to avoid overheating the crown of the retort, and so prevent the breaking down of the hydrocarbons into naphthalene, hydrogen, and carbon? If not, can such a setting be designed?

Reply.

Before one can approach the question of reducing the splitting-up of hydrocarbons in the retort by high carbonizing heats, it is desirable that the length of time during which the evolved gases are subjected to the radiant heat of the retort should be arrived at. In arriving at this, the calculations are here given, as they may be of interest.

The cubical space in a Ω-shaped retort measuring 10 ft. by 22 in. by 16 in. will be—

22 in. × 16 in. × (10 × 12) × $\frac{7}{8}$ in. ÷ 1728 = 21·33 cubic feet.

Now, 3½ cwt. of coal occupy 7·875 cubic feet space, for which deduction must be made; leaving 13·455 feet as the cubical capacity of the gas area at the commencement of a charge. As carbonization progresses, the coal swells, until at the end of the charge there is left 2·33 cwt. of coke, occupying a space of 8·75 cubic feet. The gaseous space at the end of the charge will be 12·58 cubic feet. It is fair to assume, therefore, that the average gaseous space throughout the time of carbonization will not exceed 13 cubic feet. At 10,000 cubic feet per ton, the quantity of gas produced from 3½ cwt. of coal will be 1750 cubic feet; and as there is only 13 feet of gaseous space in the retort, the average time during which the gas will remain in the retort is, with six-hour charges,

13 × (60 × 6) ÷ 1750 = 2·674 minutes.

Of course, much can take place chemically in the time, brief though it is, during which the evolved gases are "running the gauntlet" of the radiation from the sides and the crown. Though this radiant heat has the effect of breaking up hydrocarbons, yet it is of material assistance in the carbonization of the coal. It would be possible to prevent this breaking up by making larger the section of the retort of which the inner side is exposed to the evolved gases—that is, instead of having a retort of a uniform thickness of 3 inches, the upper portion could be moulded 4 inches or more in thickness. This would reduce the radiant heat; but it would necessitate greater heat being applied to the portion of the retort of thinner section, in order to efficiently carbonize the charge on the inner side of it. Any attempt to reduce, in this way, the radiant heat from the crown, would, in the opinion of the writer, reduce the efficiency of the carbonization. There would not seem to be any difficulty, particularly in segmental retorts, in making the upper portion of a retort an inch, or even more, thicker than the lower section. This would, of course, modify the mouthpiece ironwork. Hand charging, too, would be more difficult; for the upper retorts would be thrown higher, since the same space would have to be left between each tier of retorts (within the setting), for the proper circulation of the heat around and over each retort.

It may be possible, by admitting cold "blue" water gas at suitable points in the retort, to minimize the radiant heat; but this, too, would have a detrimental effect upon the heat required for carbonizing. Professor Lewes advises the admission of hot water gas to the retort. This certainly appears to be a much more effectual way of counteracting the radiation from the crown of the retort than can possibly be devised by structural modifications; for if the hot water gas does nothing else, it increases the volume of gas in the retort, and considerably lessens the period during which the gas remains in contact with the influence of radiation. This cannot fail to retain in suspension many of the hydrocarbons that would otherwise be cracked or split up.

Summing up the matter, it does not appear that any structural means can be devised for lessening radiation from the crown and sides of the retort that will not at the same time cause difficulty to arise that will be even greater than the one which it is sought to overcome.

Question No. 151.

What is the loss of benzol by evaporation in iron tanks above ground exposed to atmospheric conditions, compared with underground tanks?

Reply.

The loss of benzol by evaporation will depend on the temperature of the air. From overhead tanks it will be greater in the summer than in the winter; and in winter it may even be less from overhead than from underground tanks. The vapour tension of benzol is as follows:

At 14° Fahr.	.	.	.	.	14·97 mm. of mercury.
„ 32° „	.	.	.	.	26·54 „ „
„ 50° „	.	.	.	.	45·19 „ „
„ 68° „	.	.	.	.	74·13 „ „

that is, the vapour given off at the various temperatures set forth, and mixed with air or another gas, would exert a pressure equal to a column of mercury of the height stated, and reduce the original pressure of the air or gas by the same amount.

A gas, therefore, would be capable of taking up (say) at 50° Fahr. (45·19 × 100) ÷ 760, or 5·9 per cent. of benzol. The average temperature of the ground is about 50° Fahr., and of the air in summer (say) 68° Fahr. Air at 68° Fahr. can take up 9·7 per cent. of benzol vapour; at 50° Fahr., 5·9 per cent.; and at 32° Fahr., 3·4 per cent.

The losses possible by evaporation will be in the following proportion:—

	Per Cent.
Above-ground storage, summer	9·7
„ „ „ winter	3·4
Average	6·55
Below-ground storage, average	5·9

a difference in favour of below-ground storage to the extent of 0·65 per cent. There need not, however, be any actual loss, as the benzol tanks are naturally kept covered and air-tight, and a vent-pipe may be carried from the tanks to the nearest gas-main, and all vapours given off will be utilized in enriching the gas as it passes either to the holders or to the district.

The actual quantity of benzol vaporized will entirely depend on the ventilation of the area surrounding the tanks, and whether the latter are exposed to the wind or to the direct heat of the sun. It can be calculated from the following data:—

V = volume of wind in cubic feet passing over the tanks in a given time.
T = temperature of the air.
d = weight in grains of a cubic foot of benzol vapour at T.
t = vapour tension of benzol vapour at T.

$$Q = \frac{V \times d \times t \times 100}{760}$$

d at 50° Fahr. = 1576 grains; at 60° Fahr. = 1547 grains; and at 68° Fahr. = 1524 grains.

So that if 1000 cubic feet of air per hour at 50° Fahr. passed over the surface of an open benzol tank, the benzol would evaporate at the rate of—

$$Q = \frac{1000 \times 45{\cdot}19 \times 1576 \times 100}{760} = 94{,}560 \text{ grains per hour.}$$

$$Q = \frac{94{,}560}{7000 \times 8{\cdot}84} = 1\tfrac{1}{2} \text{ gallons per hour.}$$

At 68° Fahr., the loss would be—

$$Q = \frac{1000 \times 1524 \times 74{\cdot}13 \times 100}{760} = 147{,}828 \text{ grains per hour.}$$

$$Q = \frac{147{,}828}{7000 \times 8{\cdot}84} = 2{\cdot}4 \text{ gallons per hour.}$$

To correct these figures for evaporation from covered tanks would involve abstruse calculations, too deep for a communication of this description. All we can say is that the loss from overhead tanks would be nearly twice as much as from underground tanks in the summer, and about the same in the winter.

Question No. 201.

In recording the gas make and yield, why do some managers correct the station-meter readings for temperature, and not for height of barometer? Is it necessary, or does it serve any useful purpose, to make these corrections? What is the apparent effect upon the unaccounted-for gas?

Reply.

Most gas managers correct the station-meter readings for private reasons only—*i.e.*, to obtain a more accurate knowledge of the yield of gas per ton, so as to be able to compare the figures of various periods of the year. The variations of temperature have a far greater effect on the volume of the gas than the variations of barometrical pressure; and it is impossible to compare the apparent makes in the winter and in the summer unless corrected for temperature. The barometer, however, may be high or low with a low or a high temperature; and it is generally ignored even for comparison, though if absolute accuracy is desired the volume of gas should be corrected to 30 inches barometrical pressure, as well as to 60° Fahr. But, for all practical purposes, it is unnecessary, and does not serve any useful purpose, unless the meter readings be abnormally high. Should the correction made be from a lower temperature to 60° Fahr., the apparent effect will be to increase the unaccounted-for gas;

while if the correction be from a higher temperature to 60° Fahr., the apparent effect will be to decrease it, for the temperature of the gas passing through the consumers' meters will be less than the station-meter temperatures, and approximate to the mean atmospheric temperature, being generally below it, and about the same as that of the ground through which the pipes are laid.

By the kind permission of Mr. Woodward, I am able to reproduce a record I kept, while at the Salford Gas-Works, of the temperatures of gas at the station-meters and at two points on the district, each about two miles from the works, past which there was a good flow of gas. The following figures give the averages for each month:—

1894.	District. Deg. Fahr.	Works. Deg. Fahr.	1895.	District. Deg. Fahr.	Works. Deg. Fahr
March	38·3	54·7	Jan.	33·2	51·3
April	44·2	61·6	Feb.	29·0	52·5
May	44·2	58·6	March	36·9	56·1
June	50·7	61·4	April	40·7	60·9
July	57·1	69·2	May	48·7	63·2
Aug.	53·8	63·2	June	54·0	66·9
Sept.	49·8	65·5	July	53·1	70·1
Oct.	44·0	60·7	Aug.	56·1	68·2
Nov.	41·9	61·3	Sept.	50·5	69·4
Dec.	37·7	53·9			

From the foregoing it will be seen that the temperature of the gas at the consumers' meters varies much more than at the works' meters—viz., from 29° Fahr. in February to 57° Fahr. in July on the district, against 51·3° Fahr. in January to 70·1° Fahr. in July at the works.

The very low temperatures of January and February were due to the prolonged and severe frost in 1894-5, and are abnormal; while the temperatures at the meters are higher than in many works. Still, even here, if the correction is made to 60° Fahr., the apparent effect will be to increase the unaccounted-for gas, as by far the greater quantity of gas is made when the meter temperature is below 60° Fahr. At my present works, where the meter temperatures average 9° Fahr. less than these, the apparent leakage would be 7½ per cent. on the total, instead of the actual one of 5½ per cent.; while if a correction is made for the average difference between the temperature of registration on the works and on the consumers' premises, the unaccounted-for gas would not be more than 2½ to 3 per cent., which, considering the amount of condensation in the straggling area, is not unreasonable.

The answer to the question, then, will be that correction of the gas measured by the station-meter is unnecessary; it does not serve any useful purpose; and it would adversely affect the apparent unaccounted-for gas.

Question No. 251.

What amount of skill is required to work a suction gas-producer? What are the risks? And what amount should be allowed for wages, upkeep, and depreciation?

Reply.

The plant is little more than a slow-combustion stove, and requires the putting in of fresh fuel about every three or four hours. Any intelligent labourer will understand the plant in two or three days, and two hours per day attendance can be considered ample for a plant of from 20 to 50 brake-horse-power. The pipes require cleaning out every four to six months, and the coke-scrubber every six months. This would occupy from two to four hours. It is scarcely fair to say that any real skill is required.

As to risks, taking fire first, the insurance company accept the plant in most instances without raising their premiums. In one case, where a boiler in a room next to a corn-mill affected the insurance, a suction plant was allowed without increased premium. There is no more risk of fire than with a slow-combustion stove. There being no gas made at a pressure, there can be no escape or danger in that way. For the same reason, there is no risk of poisoning. When the plant has to be disturbed for cleaning purposes, there is some risk; and for this reason the makers always advise that two men be present whenever any joints are broken.

With regard to wages, upkeep, and depreciation, from 5s. to 6s. per week will be sufficient wages for a plant of from 20 to 50 horse power; and for upkeep, 2½ per cent. on the outlay is ample. With the exception of the fire-brick lining, there is nothing to wear out. For depreciation, 5 per cent. is ample, for the same reasons.

Question No. 252.

What is the average fuel consumption per horse-power-hour on suction gas-producers for a 10-hour load, taking into account stand-by losses?

Reply.

The fuel consumption can be taken, for anthracite coal, at from 1 lb. to 1¼ lbs. per brake-horse-power, including stand-by loss, or from 1¼ to 1½ lbs. of coke; and from 3 to 3½ gallons of water. Anthracite will cost about 25s. per ton in the Manchester district. Anyone familiar with the plant for making water gas will readily follow the above remarks.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Naphthalene Complaints.

At their Meeting last Friday, the members of the Association had read to them a paper by Mr. W. H. Vanner, of the Walton-on-Thames and Weybridge Gas Company, on "An Experiment with a View to Overcoming the Naphthalene Trouble."

The author explained that, at the works where he was engaged, there was a carburettor which was formerly used for enriching the gas with benzol; and this was now employed for vaporizing paraffin, for the purpose of reducing the number of naphthalene complaints. This carburettor, he said, was constructed of cast iron, and was about 5 feet long from end to end. The bottom was ribbed, forming a channel; and the space between the top and bottom of the carburettor was about 3 inches. A 2-inch pipe was run from the outlet of the station meter to the inlet of the carburettor; and there was a pipe of similar diameter from the outlet to the district main. The difference between the outlet pressure of the station meter and the district main ensured a constant flow of gas through the apparatus. The paraffin was pumped by means of a semi-rotary hand-pump to an overhead tank through a ¾-inch lead pipe. The capacity of the tank was about 40 gallons. From the bottom of the tank, there was a ½-inch lead pipe running to a micrometer cock, which could be adjusted to pass any desired quantity of oil; the paraffin flowing by gravity into the carburettor. At the bottom of the carburettor there was a steam-jacket fixed, about 1 inch deep; the steam entering at the inlet end, at a pressure of about 5 lbs. per square inch, after having been lowered by means of a valve from about 40 lbs. At the bottom of the steam-jacket, a ½-inch pipe was screwed at the outlet end to take off the condensed water, which flowed into a steam-trap, and then to a drain. From the bottom of the carburettor, a ½-inch pipe ran through the steam-jacket at the outlet end, to allow any heavy unvaporized oil from the paraffin to pass into a seal-pot, overflowing into a drum.

Mr. Vanner gave a comparative list showing the number of complaints caused by naphthalene in 1904 (before the starting of the experiment) and during the present year. In the eleven months from January to November, 1904, there were 355 complaints; while in the same period of the present year (with those for November partly estimated) the number was 156. For the first four months of 1905 the figures were greatly less than in the previous year; but in May there were only 17 complaints in 1904, as against 23 this year. This was, however, the only month that showed such a result; and during July, August, and September there were less than one-third as many complaints this year as last. Then in November the figure was 100 in 1904; while that (partly estimated) for the present year was no more than 26. Taking the eleven months, the average number of naphthalene complaints each week for 1904 was a little over seven; while for this year the figure worked out at something over three. This, he said, showed that the process was doing something; but he did not say it was a cure.

Mr. Vanner went on to explain that the name of the paraffin used was "Crown Diamond," obtained from the Anglo-American Oil Company. It had a specific gravity of ·814 at 60° Fahr.; and the flash-point was 77° Fahr. The average price had been a little under 5d. per gallon. The paraffin continually dripped into the carburettor, at the rate of about 2 gallons per 24 hours. He added that the carburettor was patented by Mr. W. E. Price, of Hampton Wick, and was manufactured by Messrs. Gibbons Bros., of Dudley. He was unable to inform the members what quantity of gas passed through the apparatus; but they got as much through it as they could. He concluded by drawing attention to the recent researches of Messrs. White and Clary (*ante*, pp. 388, 466) with regard to the removal of naphthalene from coal gas. These gentlemen had found a method of making the light hot tar-oils absorb naphthalene compounds from the gas as it passed over them; and this, in his opinion, seemed the way to overcome the naphthalene trouble.

Several questions were addressed to the author by the members after he had finished reading the paper. In replying to these, he said that they did not use the paraffin again and again. Only 5 or 10 per cent. of the quantity put in came over; and if they used less paraffin, they could vaporize it all. He could not tell them what proportion of the total make of gas passed through the apparatus; but they sent into it as much as they could get through the 2-inch pipe. The consumption of gas during 1904 was 86 million cubic feet. The oil so far used—2 gallons per 24 hours for 48 weeks—would be 640 gallons. The rise in the complaints during May last must have been due to the temperature of the gas in the mains and the temperature of the air. This was the only explanation he could give. He agreed that the cost of the oil would work out to somewhere about 37d. per million cubic feet of gas consumed. No water gas was made at the works; and the process was not used for enriching purposes, but solely for getting rid of the naphthalene trouble. Cannel was employed for enrichment. The apparatus in question was started two days before Christmas, 1904, and was put up as an experiment only. They got all the spirit out of the paraffin; merely the heavy oil being left. It had been carefully

ascertained that all of the complaints referred to in his paper were due to naphthalene. There were annular air-cooled condensers at the works; and they were large enough for the make. Regenerative settings were used entirely. The only reason he could think of for there being more complaints in November and December than in other months was because of the gas being colder. Of course, when the make was heaviest they did not carburet so large a proportion of the gas sent out; and probably some of the additional complaints were due to this. The process he had described was the only one that had been used to overcome naphthalene at the Walton-on-Thames Gas-Works.

Mr. R. H. Brown (who occupied the chair, in the absence of the President, Mr. W. Grafton) proposed a hearty vote of thanks to Mr. Vanner for his paper; and this was seconded by Mr. W. A. Burnett, who remarked that a lot of processes had been introduced, and from the time they had been in use, one would have expected something definite on the subject of naphthalene. The vote was cordially passed, and Mr. Vanner briefly expressed his thanks to the members.

GAS FIRES—INCANDESCENT LAMPS—FITTINGS.

It cannot be said that in these days the gas industry suffers in any way from a lack in variety of fittings and appliances for domestic and general purposes from which to make a choice. Their name is legion; and the competitors in trade show no falling off in the attempts at improvement in goods or at devising useful adjuncts. This week two firms have invited attention to various appliances and lamps that are being offered for the first time this season.

Messrs. Falk, Stadelmann, and Co., Limited.

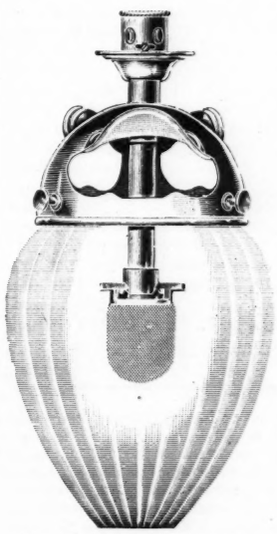
This firm are extending the heating branch of their business, and are now exploiting the "Thermos" gas-radiators. The term "radiator" in this case must not be confused with the types of heaters which we are accustomed to identify under this style. It is a heating-stove made in two forms; but the range of sizes will, before next season, be extended. The smaller size (which is constructed much after the manner of the well-known register gas-fires) is suitable for setting in a fire-place, without any fixing, other than a metal tube connection; and it is only 13 inches wide and 15 inches high. The larger fire (which is illustrated) is

The "Thermos" Gas Radiator.

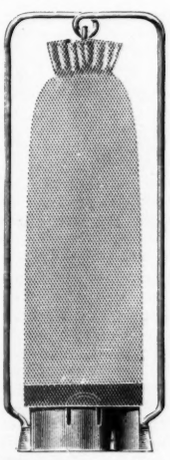
18 inches wide and 24 inches high. The construction of these fires is very simple. The bunsen burner is of the plainest; and in the examples seen in use, the flames were of the character that suggested very satisfactory combustion. A point which is regarded as, and it cannot be denied that it is, a commendable feature in fires of a cheapness that is intended to make them popular, is that the consumption of gas for the duty rendered is exceedingly low. In the case of the small fire, it is only 9 cubic feet per hour at 1½ inches pressure; and in the case of the large size, at the same pressure, it is only 14 cubic feet per hour. These we are advised are the maximum consumptions, so that, after first heating, an equable temperature can be maintained in a room on a still lower consumption. The flames are well distributed for the uniform heating of the asbestos fibre. In the large size, though the consumption is small, there are no less than fourteen jets, and in the small fire five. The flames play on the rows of asbestos fibre and a fire-clay back; the fibre being kept in position by wires let into grooves in the fire-brick. The fibre is thus easily and cheaply renewable. For the size of fire, the casing of the larger form gives considerable radiating surface, and in the curved top of the fire is a hot-air chamber.

The log gas-fire at one time had an extremely bad name, for many reasons which are so well known by gas men that their defects may be allowed to rest without special mention. We remembered them, however, when inspecting the "Driftwood" pattern of log fire that we believe comes from America, and which Messrs. Falk, Stadelmann, and Co. are putting on the market. A large show-room, with doors constantly opening and draughts about, is not the best place for trying this form of fire; and therefore we must rely upon the information that is given that, in these particular log fires, the drawbacks of past patterns have been overcome. The material of which the logs are composed is of hard clay; and the makers claim for it great durability. There is a gas regulator beneath the bottom logs; and at the will of the user the flames can be either luminous or atmospheric. Altogether there are what appear to be six logs—two large ones at the bottom, and four of smaller size at the top. The three topmost ones do not burn; but the front bottom and the central logs burn over and under the top ones—the front bottom log being supplied with a supplementary internal device for distributing the gas evenly over the burning space. The space between the top logs is supplied with asbestos fibre, which produces the glowing effect as of wood burning. The back bottom log is a trough, and when supplied with water keeps the atmosphere moist.

Turning to the gas lighting department, attention is claimed for an inverted burner, to which the well-known trade name of "Veritas" has been applied. Messrs. Falk, Stadelmann, and Co. are using this burner under licence from the New Inverted Company. The burner is very neatly constructed, and simplicity and cheapness are again features. The gas-nipple is interchangeable; so that the burner may be readily applicable to any quality of gas—for example, the firm's Scotch house is supplied with nipples having finer holes than are required in London, owing to the ruling higher illuminating power of the Scotch gas. The burner is, of course, fitted with an air-regulator; and it is pointed out as a testimony of perfect combustion, that the china deflector of the burner examined, after some months' use, was not soiled. The illuminating duty is stated at rather more than 20 candles per cubic foot of gas consumed; the consumption, under ordinary conditions, being 3 cubic feet, and the illuminating power 65 candles. The burner is well made, and can be had in various finishes. Before long, the firm will be putting on the market a burner of smaller size.



The "Veritas" Inverted Burner.



The Veritas "Compactum" Mantle.

Among vertical burners, Messrs. Falk, Stadelmann, and Co. have a new high-power one, to which the name of "Verax" has been given. The special feature of it is that it has a patent adjustable nipple for the regulation of the gas supply, so as to secure the best admixture according to the quality of the gas. The interior part of the burner into which the gas-nipple penetrates is made slightly tapered, and the head of the nipple is slit like a Y; so that the tighter the nipple is screwed up the tapered casing the finer become the slits, and the smaller the consumption, and *vice versâ*. When the gas supply is properly adjusted, there is a set-screw for maintaining the nipple in position. The air supply to the burner is on a liberal scale; and, though the illuminating power is placed at 200 candles for a consumption of 7½ cubic feet of gas at 12-10ths pressure, the burner is not of an out-size requiring anything but ordinary stock mantles.

A novelty in the way of a combined mantle support and protector is found in the "Veritas Compactum" mantle. These mantles are fitted to a double-wire support mounted on a brass cap at the base, which will fit

every "C" pattern burner. This support gives protection to the mantle from the beginning to the end of its life. It prevents vibration of the mantle in the box during transit; and no harm can come to it by handling on its removal from the box. The device ensures that the mantle is rigidly held in a central position during use; and the side wires prevent the chimney coming into contact with it during the removal or replacement of the latter. The mantle thus supported and protected can be lifted off, and stood anywhere, when the burner requires cleaning. This is a consideration, and yet the price but little exceeds that of ordinary mantles.

Messrs. J. & W. B. Smith.

Among the serviceable and excellent lamps that Messrs. J. & W. B. Smith have in this season's goods is one called the "Orion," which is especially applicable for shop lighting. The burner and its fittings are carried by a strong tubular frame, on which is also affixed a head ring supporting an expansive opal or enamelled metal reflector. For business purposes, seeing that simplicity means ease in the ability to keep a lamp in good order, this one would be hard to beat in this respect. The illuminating power is about 200 candles; and as no special means are applied to enhance the illuminating power, the burner requires some little attention. It is a large burner, made for a mantle of the Lucas 400-candle power size; so that there is a considerable incandescent area. The head of the burner, therefore, supplies a spacious mixing-chamber. No provision is made for regulating the air supply; but, on the contrary, a very simple and convenient arrangement enables the gas supply to be adjusted. The head of the nipple is cross split (X); and all that the user has to do is to raise or lower a little lever—after the form of a pilot-light arm on an ordinary burner—to close or open the slits to regulate the passage of the gas to get the best mixture for yielding the highest luminosity, according to the quality of the gas. That is all; and it is a generous light, which, surrounded by a diffusing globe, presents the appearance of a large luminous ball. The mantle is suspended by an outside adjustable support. The burner (which can be had separate from the lamp and other fittings) is supplied with a bye-pass.

THE "ORION" LAMP.

A Minimum Wage at Manchester.—The Rivers Committee of the Manchester Corporation have decided to put into operation the minimum wages resolution adopted some time ago by the City Council, under which no able-bodied workman was to be employed at a wage of less than 25s. a week. It is said that this decision of the Rivers Committee will affect some hundreds of men, and will increase the wage bill of the Committee by about £400 a year.

Portsmouth Water Company.—At the half-yearly general meeting of this Company held last Thursday, under the presidency of Mr. W. Grant, J.P., the report of the Directors, noticed last week (p. 560), in the course of which Messrs. Joseph Quick and Son, M.M.Inst.C.E., the Company's Consulting Engineers, referred to the satisfactory completion of the Hilsea Creek tunnel, and the laying therein of two 36-inch and two 20-inch mains, already mentioned in our columns, was adopted; and the assent of the shareholders was given to the promotion of a Bill next session to enable the Company to raise additional capital for purchasing land to increase the supplies of water.

The Lesson of a Strike.—Yet another object-lesson has just been furnished in connection with the historical strike at the Penrhyn slate quarries. It had been intimated that a reduction of 10 per cent. in wages would come into operation with the new year; and a deputation of the men waited upon the Chief Manager (Mr. Young) to discuss the matter. To their great disappointment, however, Mr. Young stated that there was no possibility of making the reduction less. Owing to the strike, merchants had gone elsewhere for slates; the produce of foreign quarries had got into the market; and the home quarries had become overstocked. This curtailment of wages, which affects some 3000 hands, is viewed with great concern at Bangor and Bethesda.

Alleged River Pollution by the Horley Gas Company.—At a meeting of the Conservators of the Thames on Monday last week, the River Purification Committee reported that notice was served in 1901 on the Reigate Rural District Council in respect of the discharge of offensive matter into a water course communicating with the River Mole from a surface-water drain at Horley. The Council had since served notices on the Horley Gas Company, from whose works the pollution arose; but although filtration works had been constructed, the pollution continued. A certificate from the Analyst showed that a sample of the discharge from the drain, taken on the 27th ult., was contaminated with ammoniacal liquor, and was of a very bad character. Having regard to the continuance of the pollution, the Conservators decided to instruct their Solicitor to take proceedings against the Council for non-compliance with the requirements of the notice served upon them.

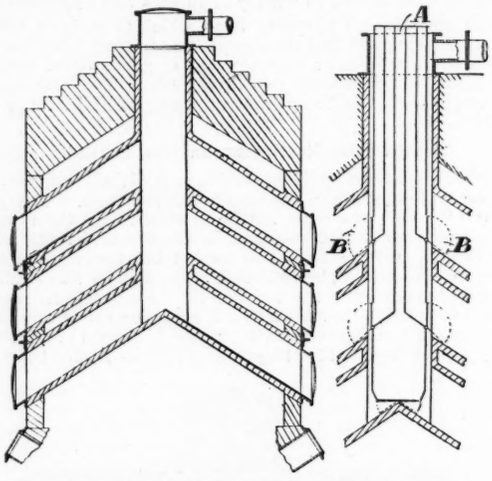
REGISTER OF PATENTS.

Inclined Retorts and their Charging.—Redman, T. & R., of Bradford. No. 24,308; Nov. 10, 1904.

An article on "Redman's New Carbonizing Systems" appeared in the "JOURNAL" for Dec. 20 last year, p. 909; and in this were given many of the particulars included in the patent specification just issued bearing the above number and date.

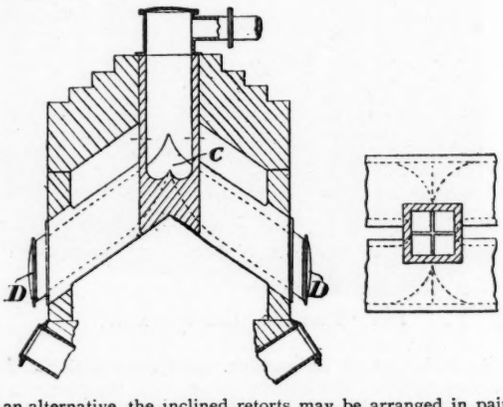
In the words of the patentees: "The invention has for its object the mounting of inclined retorts in a manner for effecting carbonization and increase in the quantity and quality of gas evolved; combining with each set of connected retorts a vertical shaft adapted for collecting the gas evolved; charging by apparatus constructed so as to rapidly and simultaneously deposit coal to each inclined retort on both sides of the shaft when one retort is set above another; when the inclined retorts are on each side of the base of the vertical shaft and placed parallel to each other, the charges of coal to be effected in like manner, or intermittently deposited within the retorts by dropping the coal to the bottom of the shaft, the base of which is formed so as to distribute the coal within the retorts."

The general arrangement of the suggested retort-stack has already been illustrated; so that a small reproduction of this part of the patent drawings will suffice to remind readers of the character of the proposal, and attention may be mainly directed to the charging-device.



This consists of a receptable A, suitably divided into compartments in accordance with the number of retorts to be fed. In the arrangement shown, there are three retorts one above another on each side of the vertical shaft; and the compartments in the feeding receptacle on each side correspond with this number. Each compartment is provided with a hinged door B, held close by suitable catches applied and operated in any convenient manner.

When charging the retorts, the cover of the vertical shaft is removed and the receptacle A inserted. On the catches holding the hinged doors being liberated, the doors drop towards the retorts, into which the coals from the respective compartments escape, and by gravitation slide on the floor of the retorts towards the bottom end. The receptacle A is then withdrawn from the vertical shaft—the hinged doors moving into a position close to the body of the receptacle for allowing the latter to be raised clear of the shaft. The cover of the shaft is then replaced, and the crude gas ascends through the vertical shaft to the outlet pipe connected with the hydraulic main.



As an alternative, the inclined retorts may be arranged in pairs at the bottom of a vertical shaft, in line with each other; but instead of placing them one above another (as before described), they are parallel—two retorts laying side by side, with free communication with the centre vertical shaft. At the base of the shaft in this case a pyramid C is formed in a manner adapted to direct the coal equally into each retort; so that on lowering into the vertical shaft a receptacle provided with hinged doors at the bottom, and liberating same in any convenient manner, the coal is delivered upon the pyramid, the inclined sides of which direct it to the respective retorts.

By forming at the base of the vertical shaft the pyramid C, the charging may be automatically carried out by an intermittent deposit of coal from a rotary measuring and feeding receptacle mounted within a casing secured to the mouthpiece of the vertical shaft—the receptacle being rotated in any convenient manner. The rotary casing receives its deposit of coal when communication with the vertical shaft is cut off; and the receptacle in revolving carries the coal with it until it arrives at an opening over the vertical shaft, when the coal drops upon the pyramid at the base, the inclined surfaces of which direct the coal into the inclined retorts down which it slides towards the covers D, which are removed at intervals for extracting the resultant coke.

Bill Delivery Mechanism for Meters.—Gallagher, R. W., of San Francisco. No. 28,995; Dec. 30, 1904.

This invention has for its object to provide a device by means of which a gas consumer can at any time obtain a record of the amount measured by his meter in duplicate—one of which will be presented to the consumer as a bill, and the other will be turned in at the office.

The device is contained in a casing having a door at the front, and hinges at its upper edge. The door is a vertical central slot, and through it extends an operating lever having a head by which the lever may be vibrated. The lower end of the slot is enlarged to such size as to permit the head to pass through it, so that when the lever has been depressed to its lowest position and the head is opposite the slot, the door can be swung upwards—permitting access to the interior of the casing; but the door cannot be opened until the lever has first been brought to its lowest position.

The lever at its rear end is yoke-shaped, and is pivoted at the back of the machine—being retracted by springs, and the sides of the yoke having slots through which pass the trunnions of a recording frame. The frame is oblong in form and has a transverse portion in which is mounted the shaft of the recording wheels. At its corners, the frame carries vertical guiding sleeves which slide upon vertical guide-rods secured between upper and lower horizontal plates. Upon the lower ends of the sleeves is secured a recording plate.

The recording is preferably effected by needle points secured on the under side of the recording plate. They are arranged on the plate in the form of letters or other index character, and perforate the paper to make the desired record. In like manner, the recording wheels print by perforating paper with needle points secured upon their peripheries in the form of figures. The under side of the recording plate is on a level with the bottom of the recording wheels. The meters are identified by numbers on the recording plates.

By depressing the lever, the wheels and plate are brought down so as to simultaneously perforate three sheets of paper, which pass from rolls, the shafts of which are received in spring clamps secured on the under side of the lower horizontal plate; a door being provided in the bottom of the casing for placing the rolls in position with their shafts in the clamps. The three sheets of paper pass over a pad of rubber or other material supported by the lower plate, which is slotted at the end to permit the sheets of paper to pass to the upper side of it. The sheets pass between feed rollers, of which the upper two are revolved by pressure from the lower roller, while the lower roller is revolved by pinions secured to it, meshing with gear-wheels which are loose on the shaft of a winding-up roller.

The shaft is revolved intermittently upon the return or upward motion of the lever by the following construction: To the slotted sides of the yoke are pivotally attached links, which are pivoted at their lower end to levers, revolving loosely upon the shaft of the winding-up roller, and carrying at their opposite ends pivoted pawls drawn inwards by springs to engage ratchet-wheels attached to the gear-wheels. When the lever descends, the links cause the pawls to travel over the ratchet-wheels, and, upon the return motion of the lever, the pawls engage the ratchet-wheels and revolve them, and therefore also the gear-wheels and rollers, advancing the sheets of paper. Two of the sheets pass out through a slot, while the lowest sheet goes to the winding roller—being wound up thereon by springs on the shaft.

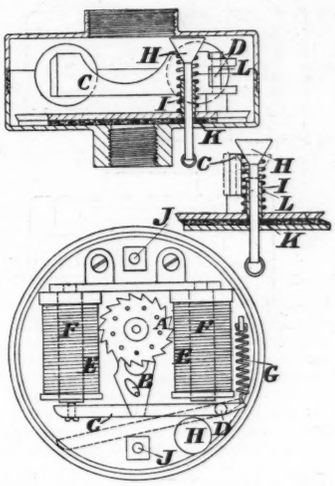
The three recording wheels have secured to them gear-wheels, which, when brought to their upper position, mesh with three other gear-wheels. One of the gear-wheels is connected by a train of gearing with a shaft coming from the meter. It is on the same shaft with a pinion meshing with another of the gear-wheels; the latter being of ten times the diameter of the pinion. The gear-wheel, in like manner, is on the same shaft with a pinion meshing with the third gear-wheel of ten times its diameter. These gear-wheels thus represent the thousands, tens of thousands, and hundreds of thousands of cubic feet of gas measured by the meter. It is, however, no longer necessary to provide the usual dial-plate, as the meter is not read from the dials, but a record is taken from them. The dials may, however, be retained if desired, as they form a check on the recording device.

The operation of the device (which is illustrated in several sheets of drawings) is as follows; The collector pulls down the lever, which causes the recording frame and wheels to descend until the needles thereon perforate the three sheets of paper which lie on the top of the rubber pad. When the lever rises again under the action of the springs, the needle points are withdrawn from the sheets of paper, and the pawls engage the ratchet-teeth and revolve the feed rollers, so as to cause the sheets of paper to advance between the rollers. When the recording wheels return to their original position, they will again mesh with the gear-wheels, either immediately or before the wheels have advanced through the distance of one tooth. The two sheets which project are torn off by the collector and handed to the consumer, and, if the bill is at the time paid, the two sheets are stamped or perforated "Paid," and one of them is given to the consumer and the other is handed in at the office together with the amount collected. If the bill is not paid, one of the sheets is left with the consumer and the other is handed in at the office, showing that the bill is unpaid. The collector then unlocks the door and, by hand, turns back the counting wheels to zero, and, after locking the door, takes a second impression, and hands a second slip to the consumer, showing that the indicator stands at zero, and, in like manner as before, hands in a duplicate of the bill at the office.

Igniting and Extinguishing Apparatus for Gas-Burners.—Down, H. L., of Cannon Street, and Wiseman, D. H., of Old Broad Street, E.C. No. 29,343; Dec. 31, 1904.

This arrangement is described by the inventors as applied to the "Telephos" gas-lighter, which embodies the well-known mechanism of a rotary valve actuated by a pawl attached to an armature deriving its movement electro-magnetically. Apparatus of this kind, being liable to get out of order, it is desirable, the patentees consider, to provide emergency gear to be operated by hand, so as to control the gas supply independently of the electrical mechanism; and the more immediate object of the present invention is to provide such emergency gear.

The action of the Telephos apparatus shown is as follows: On passing a current through the coils E, the cores F become magnetized and attract the armature C. This causes the pawl B to operate the valve A, and allow gas to pass into, or be cut off from, the burner. By means of the spindle H, the operation described can be performed. The spindle passes through the tube I, which is screwed into the base-plate; then through the washer K; and out at the bottom of the chamber. The washer may be made of any material that will give a gas-tight joint. L is a spring keeping H up in its normal position.



It will be evident that, owing to the proximity of the armature C, when the spindle H is pulled down, the coned face, coming into contact with the edge of the armature, presses the latter outwards until it takes up the new position shown dotted. The cone is so arranged that the stroke it gives to the armature is the same as that given by the usual electrical impulse; and therefore the valve A will have a corresponding movement. On releasing the spindle, it is carried up to its normal position by the spring.

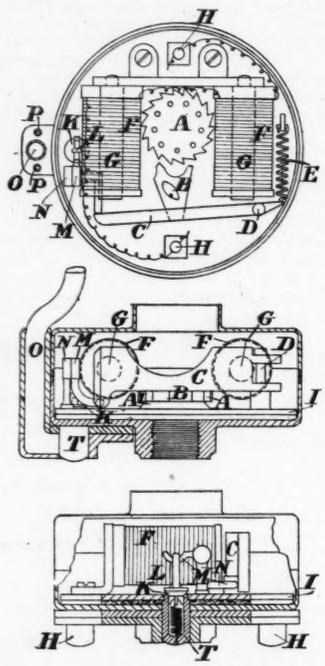
Gas Igniting and Extinguishing Apparatus.—Down, H. L., of Cannon Street, and Wiseman, D. H., of Old Broad Street, E.C. No. 29,346; Dec. 31, 1904.

This invention relates to electrical gas igniting and controlling apparatus, more particularly of the "Telephos" type; and the chief object is to arrange means whereby the electrical igniting device is not exposed to the heat of the burner, by arranging for its use in connection with which a climbing-light may be used. When an electric current is passed round the circuit, gas will be liberated into the chamber shown by means of the main valve. Part of this gas will pass through into the burner and part find its way into the bye-pass pipe by means of the small valve. The latter gas will be ignited by the platinum which is now glowing; and ignition of the main jet at the burner will be effected through the climbing-light.

A (p. 622) is the rotary valve; B the pawl; C the armature, pivoted at D, and kept in position by the spring E; F are the coils round the cores G; and H are the main terminals. On passing a current through the coils, the cores become magnetized and attract the armature. This causes the pawl B to be pushed forward and engage a tooth in the valve—thus giving the valve a rotary movement of one tooth. There are perforations in the boss of the base-plate I which correspond to those shown in A. Two steps of the valve are required to bring the perforations in the boss and the valve of one position of coincidence to the next. Therefore consecutive steps will give open and closed positions of the valve.

The bye-pass pipe O is in the position shown, communicating with the interior of the chamber through the piece T—shown in detail. T is hollow and screwed into the base-plate, having the seating for the bye-pass valve formed on its upper end. K is an ordinary lift-valve (with guides) held down on to its seat by the spiral spring U. N is a small pillar carrying a pin which forms the pivot of the bell-cranked lever M. This lever is arranged for its vertical arm to be pushed forward by the armature—thus causing the horizontal arm to lift the valve K by the connecting link L, and admit gas into the bye-pass pipe O. The holes P are fitted with brass bushes to receive the legs of an igniter; electrical connection being made from the main terminals H, through insulating washers, and into the lower ends of the brass bushes. The pipe O is bent slightly just above the chamber, and perforated from the bend up to the tip, which is in a position for its jet to play upon the main stream of gas issuing from the burner-nozzle. The igniter being placed in this bend will be played upon by the small jets issuing from the lower perforations.

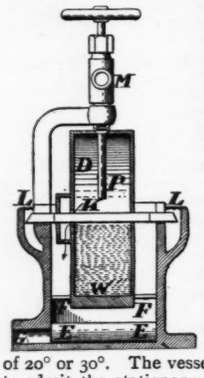
When working, the current causing the armature to move forward, as already described, will also cause the platinum of the igniter to glow. Also the armature, after overcoming the inertia of the disc-valve A, and as it approaches the end of its stroke, will strike the pin



on the vertical arm of the bell-cranked lever M—thus lifting the valve K off its seat and allowing part of the gas now streaming through the chamber to enter the bye-pass pipe O. When this gas reaches the lower perforations, it becomes ignited by the glowing platinum, and climbing to the top of the pipe ignites the gas at the burner.

Suction Gas-Producers.—Smith, H. F., of Lexington, Ohio, U.S.A. No. 4043; Feb. 27, 1905.

This invention has relation particularly to means for providing the air supplied to suction gas-producers with a constant percentage of steam or moisture regardless of the actual quantity of air supplied or the rapidity with which this quantity may change to suit varying loads on the engine. To maintain a uniform percentage of steam at varying loads on the engine, it is, of course, necessary that the supply of water from which the steam is generated should not only be proportioned to the load on the engine, but should vary quite as rapidly as the load changes.



A vertical central section is given of so much of the apparatus as is necessary to allow an understanding of the invention; also a transverse section of the apparatus employed to regulate the supply of air and water to the heating means, so as to furnish the required air and steam to the producer.

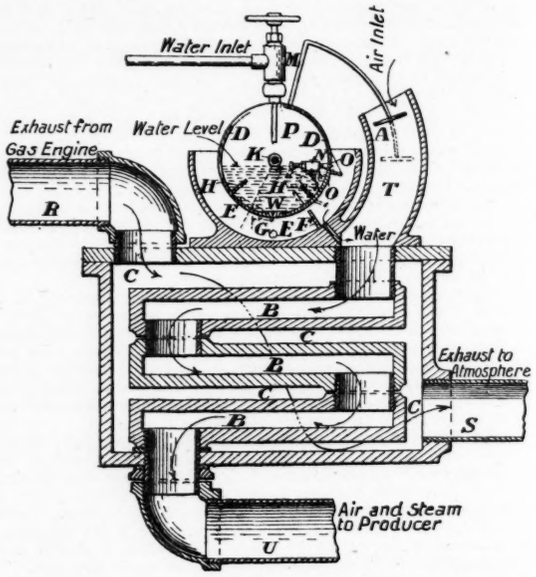
D is a cylindrical vessel supported by the shaft L on "knife-edge" bearings, so as to rotate freely about its centre through an arc of 20° or 30°. The vessel is provided with a slot in its circumference to admit the stationary water-pipe P. An overflow outlet, arranged as an annular opening K, surrounds the central supporting shaft in such a manner that its lower edge is tangent to the same horizontal plane in whatever position the cylinder may be rotated about its supporting shaft. O is an orifice whose size can be controlled by a valve N. W is a weight so placed on the circumference of the cylinder as to be directly under the supporting shaft when the orifice O lies in the plane of water level—*i.e.*, the horizontal plane tangent to the lower edge of the overflow orifice K. Vanes H are arranged to act as dash-pots so as to steady the movement of the whole. A vane A is carried upon the extremity of a curved arm so as to move freely and occupy a central position in the curved air-pipe T. The cylinder D is supported by, and carried within, a semi-cylindrical housing E, which is divided into two parts, one of which receives the drip from the overflow K and discharges it through the opening G into a waste-pipe (not shown), and another above, and to the right, which receives the water discharged from the orifice O, and conducts it through the opening into the air-pipe T. C is a chamber through which the hot gases pass, as the exhaust from the gas-engine, and which contains the hollow discs B or other extended heating surfaces, and conveys the air and water admitted into the air-pipe T.

When in operation, the valve M is opened and water is admitted to the interior of the cylinder D until it is filled to the height of the overflow K, at which point the water-level is maintained—the surplus passing out of the overflow to waste. When air is caused to flow through the apparatus, the vane A is acted upon by the air-current passing through the pipe T.

Numerous experiments have, it is said, demonstrated the action of air currents on a vane so exposed to be of the following nature:

Let P = pressure exerted on the vane.
V = velocity of air current.
C = a numerical constant.
Then $P = CV^2$.
Consequently, since for small pressures and velocities Quantity = Area $\times$ V.
(Quantity of air) $C^1 = \sqrt{P}$
But, similarly, considering the flow of water through an orifice.
(Quantity of water) = $C^{11}\sqrt{H}$ where H is the head of water above the orifice.

Comparing these equations (it should be noted that C^1, C^{11}, C^{111} are different numerical constants), it may be observed that if $P = C^{111} H$, then (Q air) = (C^{1111} Q water), (Q air and Q water meaning quantity of air and quantity of water). That is, if the head of water over an orifice is kept proportional to the pressure on the vane A, then the flow of water through the orifice will always be proportional to the flow of air through the pipe T.



But the pressure on the vane A is determined by the resistance it offers to displacement—*i.e.*, by the resistance offered by the cylinder D to axial rotation—since if no resistance were offered to such movement the vane would move with equal velocity with the air current, and no pressure would be exerted upon it. In this construction, however, the weight W tends continuously to return the vane to its original position, and hence determine the pressure on the vane.

But, for any given displacement, like that shown by the dotted lines, the turning moment exerted by W = Wr where r = perpendicular distance from the centre of gravity of W to the vertical line through the centre of rotation. This turning moment is balanced by that exerted by the vane A—*viz.*, Pr^1, where r^1 is the distance from the centre of rotation to the centre of pressure on A. Consequently, Wr = Pr^1; and since W and r^1 are constants, r = (constant xP). But from the construction, it is obvious, says the patentee, that h—the head of water over the orifice O—is proportional to r. Consequently, for this construction, P = (constant XH), and for any rate of flow of air, such a displacement of the vane and attached cylinder will occur as to cause a proportional flow of water from the orifice O. The actual quantity of water discharged per cubic foot of air can be regulated by the valve N.

Since the water discharged at the orifice O is at once conveyed to the hot surfaces B, and there entirely converted into steam, the percentage of moisture carried by the air to the producers will be constant and remain constant, regardless of the quantity of the air passing.

In view of the fact that the inventor has already constructed and operated a machine of the type described, and that it might be helpful in making a machine to avoid tedious experiments, he says in the machine in use at present by him the dimensions are as follows: Diameter of the vessel D, $2\frac{1}{2}$ inches; diameter of the orifice O, $\frac{9}{100}$ inches; weight of the weights W, 1450 grains; diameter of the pipe T, $2\frac{11}{16}$ inches; and diameter of the vane A, 2 inches.

Charging Gas-Retorts.—Fowler, S. J., of Cambridge, Mass., U.S.A. No. 7569; April 10, 1905.

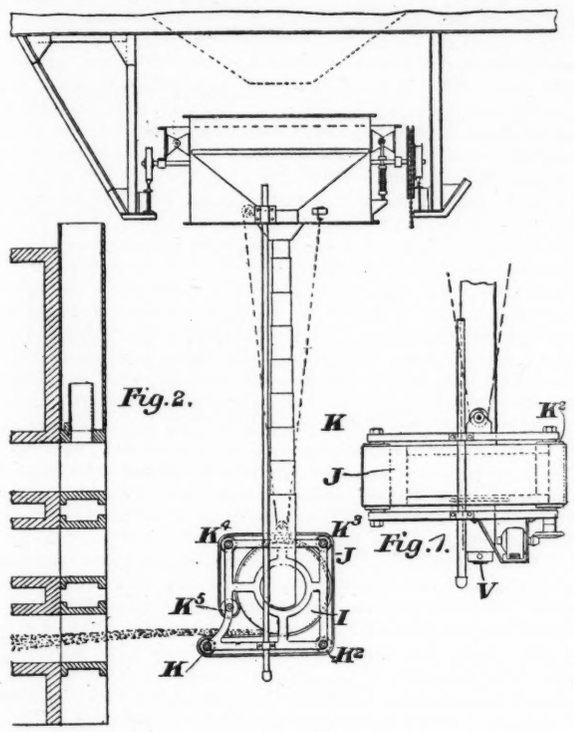
This invention has for its object to provide an apparatus for charging gas-retorts, "capable of projecting the coal in a low trajectory into a retort."

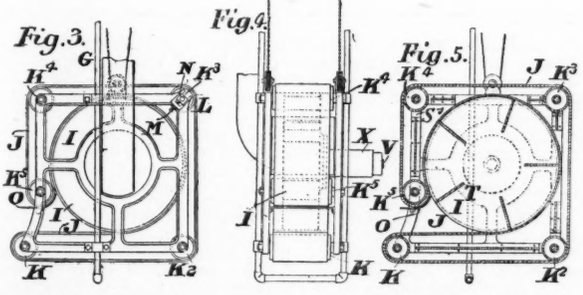
Fig. 1 (p. 623) is a side elevation, showing the projecting apparatus supported horizontally; the axes of its rotating parts being vertical. Fig. 2 is a side elevation of the apparatus with the axes of the rotating parts horizontally arranged. [The horizontal arrangement of the axes is illustrated in this and in some of the succeeding figures for the sake of convenience; the preferred arrangement being that shown in fig. 1.] Fig. 3 is a similar view (on an enlarged scale) of a portion of the projecting apparatus. Fig. 4 is an elevation as seen from the right of fig. 3. Fig. 5 represents a section of the projecting apparatus transverse to the axis of the projecting-wheel.

The apparatus consists of a projector preferably suspended from a

carriage, provided with wheels, supported by a track so as to permit of its being moved from one retort to another. It is provided with a measuring chamber or hopper and a shoot leading from the bottom of the chamber to the projector, adapted to guide the coal discharged from an overhead bin into the projecting apparatus. The telescopic shoot is supported by chains or ropes, and held steady in any position by the guide-rods depending from the carriage.

The projecting apparatus itself consists essentially of a frame in which are journaled and supported a projecting-wheel I and an endless guiding-belt J, supported and guided by pulleys so located as to maintain a part of the belt in contact with the greater portion of the periphery of the projecting-wheel. The frame is preferably mounted horizontally, so that the projecting-wheel and pulleys turn about vertical axes. One guide-pulley K is some distance to the rear of the axis of the projecting-wheel, with its upper limb approximately on the tangential line of the projecting-wheel and the retort to be charged; so that the portion of the belt passing over it will extend on a line tangential to the projecting-wheel. The guide-pulley K^5 is adjacent to the wheel I and a slight distance from the pulley K, thereby causing the belt to surround a large proportion of the periphery of the wheel and leave a narrow passage adjacent to the periphery of the wheel through which the coal may be thrown. The other pulleys are in any desired position to guide the belt





so that it will run freely. In order to take up slack in the belt and keep it in close engagement with the periphery of the projector-wheel, one or more of the guide-pulleys, as K^5, is adjustably mounted in a guideway L, formed in the frame of the projector and preferably extending radially outward from the centre of the projecting-wheel. The pulley is held at the proper distance from the centre by adjusting screws M, which act on the bearing-blocks N of the pulley. A plate or shield O attached to the frame near the guide-pulley K^5, and extending in close proximity to the belt toward the projecting-wheel, serves to protect the belt from injury by lumps of coal which may fly out as they are projected from the apparatus, and to guide the stream of coal.

The projecting-wheel consists of two discs P Q—the latter having an orifice R formed in it at its central part, thereby constituting it an annulus. Upon both the disc P and annulus Q flanges are formed which extend outwardly and form a bearing surface to support the belt J. The disc and annulus of one form of wheel are connected together by ribs or blades, preferably formed of flat plates of metal arranged radially of the wheel and extending perpendicularly between the disc and annulus, holding the latter at the proper distance apart and parallel to each other. These ribs extend from the periphery of the wheel to the edge of the orifice R, and form between them passages leading from the central orifice to the rim of the wheel.

The shoot which leads the coal from the bin to the projecting apparatus is preferably offset at its lower end to extend toward the projecting-wheel, and projects into the central orifice R, constituting a nozzle, which directs the stream of coal flowing from the bin into the central part of the projecting-wheel—the coal then falling into the space between the discs P and Q and the belt J, and being retained therein by the belt.

The belt is caused to travel about its pulleys, and the projecting-wheel to rotate in contact with it, by any suitable driving means—say, an electric motor connected directly or by gearing to the shaft of one of the pulley-wheels, or a belt so connected and driven from any suitable source of power. As the projecting-wheel and belt move in contact with each other, they both travel at the same speed; and, in operation, the wheel and belt are first set in motion and allowed to attain the necessary speed, which depends on the distance the coal is to be projected. A valve in the coal-hopper is then opened and the coal allowed to run down the shoot into the central part of the projecting-wheel and through the passages in the wheel, which latter, "together with the belt, acts upon the coal to project it by centrifugal force; the belt co-operating with the discs which form the sides of the wheel to guide the coal in a narrow, compact stream, and to cause it to move away from the apparatus in a line tangential to the rim of the projecting-wheel into a retort." The ribs act also as buckets between which are left passages through which the material to be projected is thrown by centrifugal force, and which assist by positively propelling the material. The pulley K^5, being located at only a slight distance from the tangential part of the belt, deflects any pieces of coal which might be thrown erratically outward by the wheel, and so prevent scattering of the coal and cause it all to fall within the mouth of the retort.

In fig. 1, the apparatus, as a whole, is mounted with the position of the parts such that the projecting-wheel and belt move in a horizontal plane, and the wheel throws the coal from the centre horizontally outwardly by centrifugal force; the latter being restrained by the belt and caused to leave the apparatus through the opening between the pulleys K and K^5 in a line tangential to the wheel. The device may also be positioned vertically with the rotating parts arranged to turn about horizontal axes.

Supporting Inverted Incandescent Mantles.—Blanchard, A., of Hornsey, N. No. 29,545; Dec. 31, 1904.

Hitherto the method of supporting mantles in inverted burners has been to attach them rigidly by their edge to a ring surrounding the burner-head; but the patentee proposes to employ a cup-shaped net or cage composed of threads of asbestos, or other heat-resisting material, fastened to a ring, fitting on the burner-head. The mantle is made so that when finished it fits as nearly as possible into the cage; the mantle is dropped into the cage without fixing of any kind, and is supported by the threads distributed over its surface. At the same time free expansion and contraction can take place; while its numerous points of support render it far less liable, it is said, to fracture by sudden shocks or vibrations.

APPLICATIONS FOR LETTERS PATENT.

22,675.—Westinghouse, G., "Fluid pressure turbines." Nov. 6.
22,678.—Booth, R., and Powell, F., "Gas-producers." Nov. 6.
22,708.—Bachner, A., "Inverted light." Nov. 6.
22,759.—Tatam, G. W. G., and Bywater, F. J., "Gasifying and destructively distilling carbonaceous materials by the aid of commercially pure oxygen in conjunction with steam or other gases." Nov. 7.
22,850.—Dignef, H., "Production of lighting, heating, and motive power by means of heavy benzols." Nov. 7.
22,919.—Cambridge Scientific Instrument Company, Ltd., and Burton, C. V., "Estimating and recording the quality of gases." Nov. 8.
22,929.—Allen, E., and Co., Ltd., and James, C. W., "Conveyors." Nov. 8.
22,959.—Act.-Ges. für Gas und Elektricitat and Karger, L., "Pressure-regulating device for compressed-gas plants." Nov. 9.
22,974.—Hutchins, T. W. S., and Wilkie, J. B., "Producer-gas generators." Nov. 9.
23,100.—Bäcker, W., "Gas-furnaces." Nov. 10.
23,209.—Nichols, W. H., G., & A. T., "Anti-vibrator." Nov. 11.
23,255.—Hutchins, T. W. S., "Gas-producers." Nov. 13.
23,311.—Nau, J. B., "Regenerative furnaces." Nov. 13.
23,341.—James, W., "Inverted burners." Nov. 14.
23,444.—Dentith, W., and Midgley, H., "Mantle holder." Nov. 15.
23,464.—Timmis, G. H., and Jones, W. D., "Gas-retorts." Nov. 15.
23,476.—Harrison, J. H., "Anti-vibrators." Nov. 15.
23,479.—Marr, A., and Todd, F., "Lamps." Nov. 15.
23,501.—Siewert, F., "Regenerator-ovens." Nov. 15.
23,536.—Wilson, A., "Inverted burners." Nov. 16.
23,565.—Ross, J. H., "Fixing gas-lamp bodies." Nov. 16.
23,635.—Thomas, A., "Gas-heated boilers." Nov. 16.
23,650.—Young, W., and Glover, S., "Carbonizing coals for the production of illuminating and heating gases." Nov. 17.
23,698.—Whitby, A., "Supporting mantles." Nov. 17.
23,702.—Comings, W. R., "Packing mantles." Nov. 17.
23,717.—Stoneham, H. S., and Pearson, R., "Manufacture o cyanides and ammonia." Nov. 17.
23,735.—Rook, G. E., "Anti-freezing devices for gasholders." Nov. 17.
23,739.—Lackner, M. L., "Gas-generators." Nov. 17.
23,743.—Sesseli, G., "Gas-cookers." Nov. 17.
23,785.—Cox, G. J., "Token and carrier appliances for prepayment meters." Nov. 18.
23,807.—Stoneham, H. S., and Pearson, R., "Manufacture of cyanides and ammonia." Nov. 18.
23,830.—Coulson, R., and Gill, J. F., "Gas-turbines." Nov. 18.
23,836.—Eyndhoven, A. J. van, "Manufacture of ammonium sulphate." Nov. 18.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by Correspondents.*]

Luteless Purifier Covers.

SIR,—Your offer to publish experiences, &c., on the above subject has brought out—at any rate, in the case of Mr. R. B. Anderson—personal likes, or dislikes, apparently without experience to back the opinions expressed. Surely Mr. Anderson will not for one moment assert that a "flat strip"—or call it by its old name, "washer"—takes less time to remove, stack, and replace than a rubber pad, which is properly attached to the cover, and is, for all practical purposes, part and parcel of the same. If a little thought had been given in the first place to the shape of pad best suited for the class of work to be performed, the gaskin, cheap as it is supposed to be, would never have been heard of. In the first place, it was an expedient—"the first thing to hand"—and one of those expedients sometimes seen in its Sunday dress. It may have changed its name; but it still has its youthful defects.

Your correspondent is fond of his little boy. I presume he finds him a snug little seat on the corner of the purifiers, opposite the gauge, with spanner in hand, waiting for the increased pressure. Let us hope he is an anti-cigaretter.

Dorking, Nov. 24, 1905. S. CARPENTER.

Removal of Naphthalene from Coal Gas.

SIR,—I am somewhat surprised at the laboured efforts of the "JOURNAL" to bolster up the Leicester process for the removal of naphthalene; and the latest effort in this direction calls for comment.

In the "JOURNAL" for Oct. 4, 1904, a glowing account was given of the supposed new Colson process; and it was stated: "In this washing process, the quantity of naphthalene in the gas is reduced at Leicester from 9 or 10 grains to about 1 grain per 100 cubic feet." The following week a detailed account was given of this much-praised patent, which by the way commences with an inaccurate statement, and goes on to state: "The object of the present invention is to provide a solvent which is capable of practically removing naphthalene from illuminating gas . . .;" and it consists in "an improved solvent liquid capable of removing naphthalene with certainty . . ." And later this solvent is stated to be a distillate obtained from coal tar having boiling-points between 170° and 215° C. Again it is set forth that this solvent is "capable of extracting naphthalene from the gas rapidly and with certainty. Further, when the oil becomes saturated with naphthalene, it is removed from the washer, and replaced with fresh solvent . . ."

I now turn to last week's "JOURNAL," where an endeavour is made to show that the American report of investigations carried out by Mr. D. H. Clary and Mr. A. H. White, upon this question, support the Leicester process. But, unfortunately, now it appears it has at last been found out that, "in working the process at Leicester, Mr. Colson has confessed that he has been much surprised at its success, seeing how small a reduction in the quantity of naphthalene contained in the gas is brought about by washing. Speaking generally, on the outlet of the oil washer the quantity of naphthalene contained in the gas is about one-quarter to one-third less than the quantity on the inlet; and frequently the reduction is even less than this."

I leave you, Sir, to reconcile these two conflicting statements; but no doubt you will be able to do so, seeing you were good enough to give a leading article on the saving power of naphthalene relief in your issue of Oct. 3 (instead of being a critical review of the Leicester Corporation gas accounts for the half year ended June, 1905) in which the astounding claim is made that a saving of over £12,000 had been effected by the introduction of Mr. Colson's naphthalene process—seeing that this huge alleged saving is so diametrically opposed to the experience at other works, and more especially as the increase in profits over and above the corresponding half year was only £1500. Yet from week to week in the "JOURNAL" results are chronicled in which relatively much larger profits have been made—in some cases such as to justify reductions in the price of gas—and as a matter of fact, my experience is that owing to exceptionally low prices of gas coal, the half year under review was a more favourable one for gas makers generally, irrespective of any saving otherwise effected. To most people it would have seemed wiser that an independent technical journal would have been chary in giving currency and support to such—in my opinion—absurd claim for profits made, due to the removal and absence of naphthalene stoppages.

It now appears that this much-vaunted Leicester solvent is of little value for the actual removal of naphthalene from the gas; and Mr. Colson finds after a more lengthy experience—as I pointed out in the "JOURNAL" some twelve months ago—the deficiency in natural naphthalene solvents in the gas as distributed has a much more powerful influence than the presence of one or two grains of naphthalene more or less in causing naphthalene troubles.

In my communication to the "JOURNAL" in November, 1904, the Derby process was described as essentially to consist of adding additional homologues to the gas which are active naphthalene solvents; so that they may be carried forward to exert their selective influence upon the naphthalene present, and thereby prevent its precipitation in a crystalline form, which is the cause of all the trouble and annoyance. Now it appears that Mr. Colson befogs this plain statement by talking of the gas being "lubricated" by the presence of "indene."

To put the matter clearly, if Mr. Colson will isolate the fractions common to both the Derby and Leicester solvents, he will find by taking 200 c.c. of each solvent, and distilling same over between 130° and 200° C., that some 76 per cent. of each comes over between these temperatures; and the remaining 24 per cent. of the Leicester solvent is a nearly saturated liquid substance of little practical value for naphthalene absorption, as it already contains so much.

I consider it most unfair of Mr. Colson to produce and use a solvent which consists chiefly of those homologues which are part of, or similar to, those of the Derby solvent, and then claim it as a new departure, when it is evident the success of his so-called process is almost entirely due to those constituents which are common to both solvents—the Leicester process being simply an integral part of the Derby process.

Derby, Nov. 25, 1905. J. FERGUSON BELL.

[Our correspondent is distinctly agitated; and his genial manner of recognizing our attempts to give the latest information available when it comes to us from creditable sources, when it is found in public speech, or when study of new contributions suggests similitude of experience, will be, by most of our readers as it is by ourselves, attributable to the fact that there is in existence what is called the "Derby Naphthalene Process." However, by the publication of the foregoing letter, Mr. Bell is allowed full vent for his wrath. But even the wrathful man ought to have some respect for propriety and fairness. Our correspondent is "surprised" at the "laboured efforts" of the "JOURNAL" to bolster up the Leicester process. To prove the "bolstering," he makes certain quotations; and in turn, we say that Mr. Bell has deliberately ignored certain very pertinent remarks in what has been written in connection with those quotations, in order to give an appearance of truth to his accusation of bolstering. The first quotation is taken from an article that in the opening sentences explicitly states: "By the courtesy of Mr. Colson, we are able to amplify the statement made in the report, and to give a detailed account of the method employed." The succeeding quotations are taken from the patent specification; but this again Mr. Bell does not really make clear. In the third quotation, it is definitely stated that "Mr. Colson has confessed" to being much surprised at certain experience, which experience does not show that the reduction of naphthalene is so great as was attributed to the early tests. We can report these things; but, as we are not at Leicester, we have no knowledge at hand to explain the discrepancies between the earlier and the later experiences. True the causes of these discrepancies have technical interest, and no doubt Mr. Colson will explain them. But there is little need to indulge in petty quarelling about them when the effect upon stoppages has been so good as at Leicester. Again, Mr. Bell questions the wisdom of a technical journal giving currency to the claim made at Leicester as to the financial effect of the elimination from the working of all difficulty with naphthalene. If the claim had been made at Derby—"absurd" or not—we should have published it for what it was worth, just as we are publishing Mr. Bell's letter now. In calling attention to the claim, we expressly pointed out that it was difficult for any outsider, upon the bare figures advanced by the Chairman of the Leicester Gas Committee, to judge how far they supported the claim. Mr. Bell, however, carefully ignores the reservations of the article in question, in order to "bolster" up his case. We are quite content to bear our full editorial responsibilty on all occasions; but Mr. Bell, apparently feeling that he is suffering an injustice, has allowed his anger (for the tone of his letter will allow of no better expression) to obfuscate his sense of fairness. To the other points of the letter, Mr. Colson will no doubt give attention.—ED. J.G.L.]

Inefficient Electric Lamps at Grimsby.—The Grimsby Lighting Committee have had before them the question of the street lighting of the town by electricity; it being contended that the existing arc lamps are distinctly unsatisfactory. As a result, the Engineer (Mr. W. A. Vignoles) has been instructed to investigate the matter and submit a report to the Committee. The particular points to be taken into consideration are the inefficiency of the present lamps, the necessity of replacing them, and the terms of a special depreciation fund for renewing lamps when worn out.

Electricity for Horsforth.—After a great deal of delay, the Horsforth Urban District Council have arranged for the Yorksbire Electric Power Company to take over the Order, on payment to the Council of its original cost; the Council to purchase current for street lighting purposes. The Company have offered to light, clean, and maintain eighty lamps in the principal thoroughfares, at a cost of £2 5s. per lamp per annum; each lamp to be not less than 75-candle power, and to burn 3000 hours. At the present time each gas-lamp, burning 2200 hours per annum, costs £1 15s. Before this arrangement was arrived at, there was much opposition among the ratepayers to the introduction of electricity for street lighting purposes, on the ground that it would be more costly than gas.

Torpoint Gas Company.—A meeting of shareholders was held last week for the purpose of voluntarily winding up the existing Torpoint Gas Company and forming a new Company. The old Company was established in 1857 with a capital of £1000 in £10 shares; and subsequently £2000 was taken up in £5 shares. It is now proposed to form a new Company with £7000 in shares of £1 each, of which it is proposed to call up £2500. The holders of £10 shares, with £9 paid up, will be allotted six shares of £1 in the new Company; while those holding £5 shares, with £4 10s. paid up, will be allotted three shares. The Chairman (Mr. J. Shepheard) said there was good ground for believing that the future prospects were excellent. The plant recently erected, together with new capital, would allow them to carry out further improvements. The Consulting Engineer (Mr. J. G. Clarke) also spoke hopefully of the future. It was resolved to wind up the Company voluntarily; and Mr. E. F. Clear was appointed Liquidator.

PARLIAMENTARY INTELLIGENCE.

NOTICES GIVEN FOR BILLS (SESSION 1906) RELATING TO GAS AND WATER SUPPLY.

Aberystwyth Corporation.—The Corporation of Aberystwyth intend to apply for authority to purchase, by compulsion or agreement, the undertaking of the Aberystwyth Gas Company, and supply gas within the borough and such places adjacent thereto as may be defined in the Bill, which will contain the usual provisions relating to the supply of gas. The necessary borrowing powers will be applied for.

Accrington Gas and Water.—The Accrington District Gas and Water Board intend to apply for authority to construct a well, pumping-station, and other works in the parish of Altham, in the rural district of Burnley, and a line or lines of pipes to connect them with the existing reservoir in the parish of Huncoat. Additional money powers will be sought.

Ascot District Gas.—Application will be made by the Ascot District Gas Company for authority to change their name to the Ascot District Lighting and Power Company, and extend their limits of supply so as to include the parish of Chobham. It is proposed to modify the provisions of their Act of 1882 with regard to the quality of the gas, and to reduce its illuminating power to 14 candles. Permission will be sought to produce, store, and supply electricity, and construct works for the purpose. The Bill to be promoted will contain further provisions and regulations in regard to the supply of gas, meters, fittings, &c., as well as of energy in bulk outside the defined area. More money for both undertakings will be required.

Bacup Corporation.—The Corporation of Bacup intend to ask for an extension of the time specified in their Act of 1898 for the completion of the works thereby authorized, and for some additional provisions in regard to them, as well as to the water undertaking generally, including (*inter alia*) an increase on the charges for the supply of water in the borough, and an alteration in the dates for the collection of the water-rates. Power will be sought to raise more money.

Brixham Gas.—The Brixham Gas Company will apply for power to extend their works and their limits of supply so that the latter may comprise the parish of Churston Ferrers, in the rural district of Totnes. The Company will seek permission to produce, store, and supply electricity throughout the urban district of Brixham and the above-named parish, and to construct works for the purpose. Special provisions will be made in the Bill for the purchase of the gas and electricity undertakings by the Local Authority. Additional borrowing powers will be sought.

Burry Port Gas and Improvement.—The Urban District Council of Burry Port purpose applying for authority to supply their district with gas, and construct and maintain the works required for its manufacture. The Bill to be promoted will make provision in regard to matters incidental to a gas undertaking. Section 5 of the Llanelly Gas Act, 1874, is to be varied or repealed so far as it gives the Llanelly Gas Company the right to supply gas within the urban district of Burry Port. Additional borrowing powers will be applied for.

Bury Corporation.—A General Bill of which the Bury Corporation have given notice will contain a clause to alter, amend, or repeal so much of the Radcliffe and Pilkington Gas Company's Act of 1854 as relates to the supply of gas within the borough of Bury, and to provide that the Company shall no longer supply gas there.

Cardiff Gas.—The Cardiff Gas Company intend to apply for authority to extend their limits of supply so as to include the whole or parts of the parishes of Eglwysilan, Lavernock, Lisvane, Llanedarne, Llanishen, and Pentyrch, in Glamorganshire, and Rumney and St. Mellons, Monmouthshire. They also desire power to purchase the undertaking of the Taff's Well Gas and Water Company, Limited, and certain lands for the manufacture and storage of gas, &c.; to provide for the consolidation and conversion of the ordinary capital into one class of stock; to raise more money; and to make further provision for borrowing. Permission will be sought to alter the prescribed illuminating power of the gas and the burner used for testing it; and also to make further provision in regard to the testing and quality of the gas.

Carlisle Corporation.—Application will be made by the Corporation of Carlisle for authority to acquire additional lands for water-works purposes, and also for an extension of the time limited by their Act of 1898 for the completion of the works (the Geltsdale scheme) sanctioned thereby. They will likewise apply for permission to borrow in respect of their water and gas undertakings.

Cheltenham Gas.—Authority to extend their limits of supply, so as to include Southam, Woodmancote, and Bishop's Cleeve, will be sought by the Cheltenham Gas Company, who will also apply to be placed under new provisions in regard to the illuminating power and purity of their gas. They will be prepared to supply consumers free of charge, if required to do so, with burners suitable for the altered illuminating power.

Crediton Lighting and Power.—Dissolution and re-incorporation will be sought by the Crediton Gas Company, Limited, who will also apply for authority to maintain and extend their gas-works, purchase lands, and supply gas and electricity in the urban district of Crediton and the neighbouring parishes, all in the county of Devon. In the Bill to be promoted, provision will be made for fixing the illuminating power of the gas and for testing it, regulating the supply of gas and electricity, and the sale of the latter in bulk beyond the Company's limits. Special provisions will be included for the purchase of both undertakings by the Local Authority. Additional capital and borrowing powers will be asked for.

Croydon Water.—The Corporation of Croydon will apply for powers to improve their existing water-works, and construct new ones, comprising a well and pumping-station at Wallingham, a covered reservoir at Croydon (where there will be another well, pumping-station, and filter-beds), filter-beds at Addington, and a number of aqueducts, conduits, or pipe-lines. The Bill will contain the usual provisions in regard to the supply of water. Additional money powers will be sought.

Cumberland Electricity and Power Gas.—Authority will be sought for the incorporation of a Company to establish generating stations and works for the production and supply of electricity and power gas in the boroughs of Workington and Whitehaven, the urban districts of Aspatria, Maryport, Cockermouth, Harrington, Arlecdon and Frizington, Cleator Moor, Egremont, and Keswick, and the rural districts of Cockermouth and Whitehaven, all in Cumberland. The usual powers to purchase and use lands, break-up streets, lay pipes and wires, and levy rates and charges, will be applied for, as well as others to acquire electricity undertakings by agreement, furnish electric and gas installations, supply fittings, and make agreements with local authorities and others for the sale to them of electricity, power gas, plant, or machinery, and for the supply by them of water for condensing and other purposes. Permission will be sought to raise capital, and also to apply for Provisional Orders.

Derby Gas.—The Derby Gas Company will seek permission to extend their limits of supply so as to include Borrowash, Ockbrook, Etwall, Eggington, Bearwardcote, Burnaston, and Sutton, in Derbyshire, and to purchase the small undertakings of the Spondon, Borrowash, and Ockbrook Gas Company, Limited, and the Mickleover and Etwall Gas Company, Limited. The parishes of Spondon and Mickleover are part of the limits of supply assigned to the Derby Gas Company; so that the two Companies are now supplying gas inside the Derby Company's area of supply and some neighbouring parishes outside. Terms of purchase have been arranged between the respective Companies. Further, the Company are taking the opportunity of including a clause to relieve them from all liability to penalties by reason of the presence of sulphur impurities other than sulphuretted hydrogen, and to amend section 39 of the Derby Gas Act, 1852, in respect to the supply of gas to public lamps.

Dowlais Gas.—Power will be sought for the dissolution of the Dowlais Gas and Coke Company, Limited, and its re-incorporation with additional money and other powers. Application will be made for permission to apply for a Provisional Order to supply electrical energy.

Epsom and Ewell Gas.—Application will be made by the Epsom and Ewell Gas Company for authority to consolidate and convert their existing capital, and raise more money by auction or tender. The price of gas is to be fixed, and the sliding-scale adopted. It is proposed to construct additional works, and also dwellings for the officers and workmen; and special provisions will be made for the supply of gas to Walton-on-the-Hill. Authority will be sought for the repeal or amendment of the Company's Act of 1877 with respect to the illuminating power and testing of gas. The interest on consumers' deposits is to be reduced.

Fulwood Water.—The Urban District Council of Fulwood will apply for power to construct additional works, comprising an intake, two aqueducts or pipe-lines, a reservoir, and a road diversion. Provision will be made for the preservation of the purity of the water and the prevention of waste. The rates for domestic supply are to be altered. More money will be required.

Gas Companies (Removal of Sulphur) Bill.—The object of this Bill has already been fully noticed (see *ante*, p. 551).

Glamorgan and South Wales Water.—The Glamorgan County Council will seek various powers in respect of water supplies in the counties of Glamorgan, Carmarthen, Cardigan, Monmouth, Radnor, and Brecon. It is proposed to constitute a Joint Committee or Board, on which counties and city and county boroughs will be represented; create water districts; and appoint Water Committees, whose powers and duties are to be defined. Provision will be made for promoting and opposing Bills or Provisional Orders relating to water supply; preparing a scheme for the supply of water within the district of any Water Committee; entering into negotiations, agreements, and contracts for the supply of water in bulk; and defraying the costs and expenses of the Board. These will be met by contributions from the constituent authorities, to be charged upon the county, general, and district rates.

Heacham Water.—Power will be sought for the incorporation of a Company for the construction of works and the supply of water within the parishes of Heacham, Sedgeford, Snettisham, Ingoldisthorpe, Dersingham, Fring, and Sherbourne, in Norfolk. The usual provisions will be included in the Bill to be promoted, in which the capital of the proposed Company will be defined.

Hitchin Gas.—Authority will be sought by the Hitchin Urban District Council to purchase the undertaking of the Hitchin and District Gas Company, and manufacture and supply gas and residual products in their area, as well as in certain parishes lying within a circle of two miles from the Market Place. Permission to extend the works or dispose of portions of them, supply meters, fittings, &c., sell gas in bulk beyond the limits, and erect workmen's dwellings, as well as to raise the necessary capital, will be applied for.

Holyhead Water.—The Holyhead Water Company will apply for authority to construct new works, consisting of an intake on the Llyn-Traffwll, a pumping-station, and two lines of pipes. The Bill will contain provisions for the protection of the works, and for the prevention of contamination, waste, &c. Additional capital will be required.

Huddersfield Corporation.—In a General Bill of which the Huddersfield Corporation have given notice, provisions will be included for preventing the pollution of rivers and streams in, and flowing into, the county borough.

Kettering Water.—Application will be made by the Kettering Urban District Council for an extension of time for taking lands and the construction of certain works authorized by their Act of 1901. They will also seek permission to sell their Weekley Water-Works to the Rural District Council, and the confirmation of an agreement entered into between the two bodies. The limits of the Urban Council will be altered; and the Rural Council will undertake the supply of water in the parishes of Weekley and Burton Latimer. It is proposed to extend the provisions of the Act to be obtained to other parishes and contributory places in the rural district of Kettering. Additional borrowing powers will be sought.

Kidderminster Gas.—Power will be sought to alter the name of the Kidderminster Gaslight and Coke Company by the omission of the words "and Coke," and to extend the works. It is proposed to consolidate and convert the existing capital and raise more. The Bill will include provisions for allowing discounts to consumers, and for varying the price, pressure, and quality of gas, and the method of testing. Exemption will be sought, in certain cases, from penalties for failure to comply with the enactments relating to the supply of gas by the Company.

Kingston-upon-Hull Corporation.—A General Bill to be promoted by the Hull Corporation will contain provisions in regard to the purchase of lands for the protection of the water-works, and to the supply of water to workhouses, hospitals, barracks, schools, and similar institutions.

Llandrindod Wells Gas.—Authority will be sought for the incorporation of a Company for the construction of works and the supply of gas within the urban district of Llandrindod Wells and adjoining places, and the raising of the necessary capital. The usual powers with regard to gas supply will be asked for.

London County Council (Supply of Electrical Fittings).—In a General Powers Bill of which notice has been given by the London County Council, they will renew their attempt to obtain authority for the Metropolitan Borough Councils who are supplying electricity, also to supply fittings, &c., and expend money on wiring of premises of consumers, actual or prospective, of electrical energy.

Manchester Corporation.—The Corporation of Manchester have notified their intention of promoting a Various Powers Bill, in which will be included provisions for the payment of the purchase and other moneys agreed to be paid by the Corporation to the Stretford Gas Company for the transfer to them of the Company's rights and privileges within the township of Chorlton-cum-Hardy. The Corporation will also ask to be allowed to make a deviation of one of the aqueducts authorized by their Act of last year.

Merthyr Tydfil Gas.—Application will be made by the Merthyr Tydfil Gas Company for authority to construct new or additional works, and to purchase compulsorily certain specified lands, a viaduct and siding forming a means of communication with the Taff Vale Railway, and a portion of the bed and foreshore of the River Taff. The present capital is to be converted and consolidated, and power will be sought to raise more. It is proposed to alter the provisions of the Company's Act of 1868 with regard to the testing of gas. The Bill will contain regulations as to the price to be charged for gas supplied through prepayment meters; and the sliding-scale is to be adopted for that sold in the ordinary way.

Metropolitan Water Board (Lea Valley Works).—Notice has been given by the Metropolitan Water Board of their intention to apply for power to construct two intercepting sewers, several aqueducts, and other water-works in the valley of the Lea. In the Bill to be promoted, provisions will be included for preventing the pollution of water, appropriating the waters of the Lea, Stort, and Lynch, and constituting a Joint Sewerage Board. The existing arrangements between the Water Board and the Hertford Corporation as to the disposal of the sewage of the town is to be determined. Riparian owners are to contribute towards the expenses to be incurred; and power will be sought by the Water Board to raise money by bills.

Mid-Oxfordshire Gas.—Notice has been given of the intention to promote a Bill to alter the constitution of the Mid-Oxfordshire Gaslight and Coke Company, Limited, and to confer additional powers, including the supply of gas to certain parishes in the County of Oxford. It is proposed to acquire the undertakings of the Woodstock, Bicester, Chipping Norton, and Witney Gas Companies, as well as other gas undertakings; and authority is to be asked to enable the Woodstock Corporation to lease land and gas-works to the Company. Application will be made for power to construct and maintain gas-works, supply fittings, open streets, levy rates and charges, re-arrange and limit the capital, and apply for Provisional Orders to sanction the supply of electricity.

Mirfield Gas.—Application will be made by the Mirfield Gas Company for authority to consolidate and convert their share capital, and to raise more money. The Bill will contain provisions relating to the quality of gas, the size of fittings, the exemption of the Company from penalties in certain cases, and from liability to supply gas for motive power, and other matters.

New Mills Urban District Council.—Application will be made by the Urban District Council of New Mills, in Derbyshire, for power to acquire the undertaking authorized by the Ollerset Water-Works Act of 1831 (1 Will. IV., cap. 49), and to purchase the rights of the Duchy of Lancaster in a tunnel known as the "Gow" or "Jow" Hole Tunnel. The Council will also apply for sanction to the acquisition of such portion of the water-works and plant of the Stockport Corporation as is contained within the urban district of New Mills. Powers will be sought for the maintenance and improvement of the existing gas and water works of the Council, and for making further provisions and regulations in regard to the supply of gas and water, meters and fittings, the pressure and quality of gas, the raising and application of moneys, and other matters.

Newport (Mon.) Corporation.—In a General Bill of which the Newport Corporation have given notice, authority will be sought to make bye-laws for the prevention of the pollution of the water supply.

Newquay Urban District Council.—The Newquay Urban District Council will seek authority to purchase the undertakings of the local Gas and Water Companies; construct, maintain, and improve the works; and carry on the business with the customary powers of supply within their limits, and the adjacent districts. Additional capital will be needed.

Newtownards Urban District Council.—Authority will be sought by the Newtownards Urban District Council to extend their limits of supply so as to include certain townlands in the rural district; and also to have their Provisional Order of 1883 amended to enable them to apply their surplus gas revenues to any of the purposes to which they are now, or may hereafter be, empowered to apply their rates. More money will be required.

North-East Lincolnshire Water.—The Barton-on-Humber Water Company, Limited, will apply for an extension of their area of supply so as to include a number of parishes or places in Lincolnshire. They will also seek permission to change their name to the North-East Lincolnshire Water Company, extend their works, and make agreements for the supply of water in bulk within or beyond the limits. Additional capital will be required.

North Sussex Gas and Water.—The North Sussex Gas Company will apply for an extension of their limits of supply so as to include a portion of the parish of Pulborough, in Sussex; and also for authority to maintain and continue their existing gas-works, and construct water-works, consisting of a well and pumping-station, a reservoir, and the necessary connecting pipe-line. Additional capital will be required.

Ossett Corporation.—The Corporation of Ossett will apply for an alteration of the provisions of their Act of 1900 with respect to the illuminating power of their gas, and an extension of those relating to the supply of gas for power purposes. They will also seek authority to construct a conduit and other works, and supply water in bulk within or beyond their limits. Confirmation will be sought for agreements entered into between the Corporation and the Corporation of Halifax for the supply of water.

Peterborough Gas.—It is the intention of the Peterborough Gas Company to apply for authority to acquire compulsorily, and also by agreement, certain lands for the purposes of their gas-works. The ordinary capital is to be consolidated and converted, and additional capital will be asked for. The provisions of the Bill to be promoted, which will be of the usual kind, will include some relating to the illuminating power and the purity of the gas, and the apparatus for testing them.

Pontefract Corporation.—Authority will be sought by the Corporation of Pontefract to acquire the undertaking of the Pontefract Gas Company, maintain and improve the works, and supply gas within the borough of Pontefract and the parish of Carleton, both in the West Riding of the county of York. Further powers will be applied for in respect of the gas and water undertakings, including provisions for the protection of gathering-grounds from pollution. Additional borrowing powers will be required.

Portsmouth Water.—The Portsmouth Water Company will apply for power to extend their limits of supply so as to include a number of parishes in the counties of Southampton and Sussex, construct some extensive new works, and acquire land, springs, and water. The Bill will contain provisions as to the supply of water and the fittings to be used, the prevention of waste, and the levying of rates and charges. Additional capital will be required.

Rathmines and Rathgar Extension and Improvement.—Authority will be sought by the Urban District Council of Rathmines and Rathgar to extend their boundaries, supply water and electricity within the added area, and purchase the water-mains of the Dublin Corporation therein.

Rochester, Chatham, and Strood Gas.—The Rochester, Chatham, and Strood Gas Company desire to consolidate and convert their capital, raise more money, and change their name. In the Bill to be promoted for these purposes, provisions will be included for the adoption of the sliding-scale, the regulation of the charge for gas supplied through prepayment meters, the sale, hire, &c., of fittings, the sale of gas in bulk, and other matters.

Southampton Gas.—The Southampton Gas Company will apply for power to construct additional works and raise more capital. In the Bill to be promoted, provision will be made for the repeal or amendment of the Company's Acts with regard to the quality and pressure of the gas supplied; and to provide, sell, and let gas fittings and appliances; and it is proposed to ask for authority to erect dwelling-houses for workmen.

South Lincolnshire Water.—Authority will be sought for the incorporation of a Company with power to supply water within certain parishes in Lincolnshire, and for the confirmation of an agreement made between the Company and the Spalding Urban District Council for the construction of works and the supply of water in bulk or otherwise by or to the Council to or by the Company, on such terms and conditions as may be agreed between the parishes or be prescribed by the Bill. The Company's capital powers are to be defined; and the Council are to be authorized to borrow money.

South Metropolitan Gas.—Application will be made by the South Metropolitan Gas Company for authority to purchase, compulsorily or by agreement, certain lands at Greenwich, and the construction of gantries over a footpath along the bank of the Thames. Part of the land, containing 13¾ acres or thereabouts, is reputed to have been demised by the Ecclesiastical Commissioners to Messrs. Redpath, Brown, and Co., Limited.

South Suburban Gas.—The scope of the Bill to be promoted by the South Suburban Gas Company has already been indicated (see *ante*, p. 551).

Sutton, Southcoates, and Drypool Gas.—Application will be made by the Sutton, Southcoates, and Drypool Gas Company for authority to convert their existing capital and raise more money, supply fittings on sale or hire, and erect houses for workmen. The Company will endeavour to have section 61 of their Act of 1867, respecting the price of gas supplied to the public lamps, explained, amended, or repealed.

Thornton Gas.—The Thornton Urban District Council intend to apply for power to purchase the portion of the gas-works and plant of the Poulton-le-Fylde Urban District Council in the Thornton Council's district, construct new works, and carry on the business of gas supply under the usual conditions. The Poulton Council are to continue the service until the completion of the new works. Authority will be sought to raise the necessary money.

Todmorden Corporation.—The Corporation of Todmorden will apply for authority to acquire further lands for the purposes of their water-works, and additional powers in respect of their gas, electricity, and water undertakings—the latter including power to make bye-laws in regard to the strength and quality of the consumers' plant and fittings.

Tottenham and Edmonton Gas.—Application will be made by the Tottenham and Edmonton Gas Company for power to take lands and construct works, consisting of a viaduct or overhead way from their coal-store to a point on the western bank of the Lea Navigation, and a subway under the Great Eastern Railway. Authority will be sought to construct on certain lands specified, works for the manufacture and storage of gas, as well as offices, show-rooms, dwelling-houses, and other buildings; to supply power gas; to lay pipes for oil, liquid, or other purposes; and to alter the illuminating power of the gas. The Company will seek to be exempted from the provisions of the Gas-Works Clauses Acts relating to the quality, testing, and purity of gas. Additional capital will be required.

Truro Gas.—The Truro Gas Company, Limited, desire to be dissolved and re-incorporated; and they have given notice of their intention to promote a Bill to effect this object, and to confer upon them all the necessary powers for the supply of gas, including power gas, within the parishes of Kenwyn Urban, St. Clement Urban, St. Mary Truro, Kea, Kenwyn Rural, St. Clement Rural and the detached portion of the parish of St. Erme adjoining it, and the extra-parochial manor of Tregavethan, all in the county of Cornwall. The Bill will contain the provisions now customary in connection with gas supply. Additional borrowing powers will be sought; and the sliding-scale is to be adopted.

Uxbridge Gas.—The Uxbridge and Hillingdon Gas Company will apply for authority to change their name and extend their limits of supply so as to include a number of places in Buckinghamshire; and if at any time the undertaking of the Beaconsfield Gas Company should be acquired, the whole of their district is to be included. In the Bill to be promoted, provisions will be inserted in regard to the erection and also the purchase of gas-works, the conversion and consolidation of the existing capital, and the raising of more money, the quality and price of gas, &c.

Wandsworth and Putney Gas (Removal of Sulphur Impurities).—Application will be made by the Wandsworth and Putney Gas Company for the repeal of the statutory provisions imposing restrictions in regard to the quantity of sulphur compounds (other than sulphuretted hydrogen) contained in their gas.

Watford Gas.—The Watford Gas Company will apply for power to consolidate and convert their capital, raise more money, and extend their limits of supply so as to include the parishes of Sarratt and Flaunden, in Hertfordshire, and Chenies and Latimer, in Buckinghamshire. The Company are desirous of acquiring, by agreement, the undertakings of the Chesham and Amersham Gas Companies; and if this is sanctioned, their districts are to be included within the limits of the Watford Company. It is proposed to construct additional works; amend the provisions of the Company's Act of 1883 with respect to the illuminating power of the gas; and supply fittings, engines, &c. Authority will be asked to make application for power to generate, store, or supply electrical energy.

Weston-super-Mare Gas.—The Weston-super-Mare Urban District Council will apply for authority to acquire the undertaking of the local Gas Company, and supply gas in the urban district of Weston-super-Mare and the parishes of Uphill and Kewstoke in the rural district of Axbridge, in the county of Somerset. Additional borrowing powers will be sought.

Wolstanton Gas.—The Wolstanton United Urban District Council intend to apply for authority to purchase, by compulsion or agreement, the undertaking of the Chesterton Gas Company, Limited, and supply gas in the urban district of Wolstanton United and the neighbourhood. The Council will seek power to acquire the mains, &c., of the Burslem and Newcastle-under-Lyme Corporations within their district, and also to maintain, extend, and construct gas-works and carry on the business of gas supply. Permission will be sought to raise the necessary money.

Yarmouth Water and Lowestoft Water and Gas.—The Great Yarmouth Water Company and the Lowestoft Water and Gas Company intend to apply for power, jointly or severally, to abstract and supply water from the River Bure, purchase land, and construct additional works. The Lowestoft Company also wish for authority to supply water-meters, &c., and gas in bulk, and also to enter into agreements with the Corporation in regard to the formation of sea defences. The two Companies wish to be empowered to supply water in bulk. Agreements are to be entered into with respect to the construction, operation, and maintenance of the intended works, as well as the payment for them, and the exercise of the powers applied for. Additional capital will be required.

PROVISIONAL ORDER APPLICATIONS (SESSION 1906).

Board of Trade, under Gas and Water Works Facilities Act, 1870.

Bolsover and District Water.—The Bolsover District Water Company, Limited, will apply for authority to amend the basis upon which the rates and charges for water are payable under their Order of 1903, so that they may be calculated on the annual instead of the rateable value of the premises supplied. Additional capital is required.

Charing and District Gas.—The Charing and District Gas Company, Limited, will apply for authority to maintain, continue, and construct gas-works, and supply gas in the parishes of Charing, Lenham, and Harrietsham, in Kent, under the usual powers. They will ask for permission to apply for a Provisional Order or Licence for the supply of electrical energy; and also to define and regulate their existing capital and increase it.

Chichester Gas.—The Chichester Gas Company will apply for power to raise additional capital; supply meters, fittings, and other apparatus; and limit the period of error in defective meters. They will seek to alter the provisions of their Act of 1868 relating to the illuminating power and quality of gas, and to be relieved from their existing obligations with respect to the removal of sulphur compounds, as well as from penalties in cases arising from "unavoidable cause."

Corsham Gas.—The Corsham Gas Company, Limited, will apply for power to maintain and extend their gas-works, and supply gas in the parishes of Corsham, Lacock, and Biddestone, in Wiltshire, under the conditions usually granted to owners of gas undertakings. The amount of the capital is to be regulated and defined; and the Company will ask permission to raise more.

Farnham Gas.—The Farnham Gas Company will apply for authority to raise additional capital by the issue of shares or stock or by borrowing.

Great Grimsby Gas.—The Great Grimsby Gas Company will apply for power to extend their limits and raise additional capital.

Great Grimsby Water.—The Great Grimsby Water Company will apply for power to extend their limits and raise additional capital.

Herne Bay Water.—The Herne Bay Water Company will apply for power to raise additional capital.

Hoylake and West Kirby Water.—The Hoylake and West Kirby Gas and Water Company intend to apply for authority to construct a pumping-station and a conduit or pipe-line, purchase lands, and raise additional capital.

King's Lynn Gas.—The King's Lynn Gas Company will seek power to raise further capital.

Maidstone Water.—The Maidstone Water Company will apply for power to raise additional capital.

Mid-Kent Water.—The Mid-Kent Water Company desire to extend their area of supply and raise additional capital. It is proposed to alter the limits of the Cranbrook District Water Company.

Newport Pagnell Gas.—The Newport Pagnell Gas Company will apply for authority to maintain and continue their works and supply gas in Newport Pagnell, in Buckinghamshire. The Order will contain provisions in regard to the capital and borrowing powers of the Company, the amount of dividend and interest to be paid, and the application of insurance, reserve, and renewal funds.

Pontardulais Gas.—Authority will be sought by the Pontardulais Gas Company, Limited, to maintain and continue their existing works, and supply gas in the parish of Llandeilo-Talybont, in Glamorganshire, and in the parishes of Llangennech and Llanedy, in Carmarthenshire, under the usual powers; and also to raise additional capital.

Poole Water.—The Poole Water Company will apply for power to maintain and extend their works, and supply water within certain limits defined. Permission will be sought for the sale of existing works and lands, the purchase of other lands and easements, the abstraction of water, and the supply of meters, fittings, &c. Additional capital will be required.

Raunds Gas.—Application will be made by the Raunds Gas Company for authority to maintain and improve their existing works, and supply gas in Raunds and Stanwick, in Northamptonshire. Additional capital will be required.

Redditch Gas.—The Redditch Gas Company will seek power to acquire additional lands, raise more capital, and make further provisions in regard to the supply and consumption of gas, including the size and material of pipes and fittings and the sale of gas by means of prepayment meters.

Rickmansworth Water.—Authority will be sought by the Rickmansworth and Uxbridge Valley Water Company to lay down a new main or line of pipes, and employ their funds and revenues for this work and for the general purposes of the undertaking.

St. Austell Gas.—The St. Austell Gas Company desire authority to maintain, continue, and construct gas-works, supply gas and fittings in certain districts in the county of Cornwall, and make agreements with local authorities. The capital is to be regulated and defined, and more will be required.

Sleaford and District Water.—The Sleaford Water Company will apply for power to construct a reservoir in the parish of Quarrington, in Lincolnshire, and to increase their capital.

Slough Water.—Application will be made by the Slough Water Company for power to raise additional capital, and extend their limits of supply so as to include the parishes of Fulmer, Hedgerley, Hedgerley Dean, and parts of the parishes of Horton and Burnham.

Wath-upon-Dearne Gas.—Power will be sought by the Wath-upon-

Dearne and District Gas Company, Limited, to raise additional capital, and acquire by agreement further land for gas-works purposes.

Wollaston Gas.—The Wollaston Gas Company will apply for authority to maintain, continue, and construct gas-works, and manufacture and supply gas in the parishes of Wollaston, Strixton, and Bozeat, in the county of Northampton, under the usual powers. The present capital is to be defined, and permission will be sought to raise more.

Local Government Board, under the Public Health Act, 1875, and the Gas and Water Works Facilities Act, 1870.

Arlecdon and Frizington Gas.—Application will be made by the Arlecdon and Frizington Urban District Council for authority to construct gas-works, manufacture gas and residual products, supply gas and fittings, and generally carry on the business of a gas undertaking.

Audley Gas.—The Audley Urban District Council will apply for power to maintain, continue, and extend their gas-works, and manufacture and supply gas. Confirmation will be sought for an assignment, dated March, 1878, by the Kidsgrove Gas Company to the Audley Local Board (the Council's predecessors) of the Company's rights and powers in regard to the manufacture and supply of gas within their district. Authority will be sought to supply meters, stoves, and fittings, as well as to borrow money.

Liverpool Corporation (Fazakerley) Gas.—Application will be made by the Corporation of Liverpool for authority to purchase lands and construct and maintain works for the manufacture and supply of gas within the township of Fazakerley, in the city of Liverpool. The usual powers to lay pipes, supply meters, fittings, &c., and levy rents, rates, and charges, will be sought, as well as permission to borrow more money.

Marsden Gas.—Authority will be sought by the Marsden Urban District Council to purchase by agreement certain lands upon which to extend their gas-works, and to use for the purpose their existing funds and any money they may hereafter be authorized to raise. They also wish to be empowered to alter their rents, rates, and charges, and to raise more money.

Secretary for Scotland, under the Private Legislation Procedure (Scotland) Act, 1899.

Dumbarton Water-Works and Burgh Extension.—The Corporation of Dumbarton will seek power to construct additional water-works, consisting of a reservoir in the parish of Arrochar, filter and clear-water tanks, a conduit or pipe-line, and an access road. It is proposed to extend the boundaries of the burgh, and to include within the limits of compulsory water supply the districts intended to be annexed, to which the existing provisions relating to the supply of gas, electricity, and water are to apply. Additional borrowing powers will be sought.

Dumbartonshire Water.—Authority will be sought for the Eastern District Committee of the County Council of Dumbarton and for the Council itself, or one of them, to acquire lands, waters, and easements, and construct additional works, consisting of a reservoir, two catchwater conduits, and a line of pipes. Power will be applied for to supply water to Duntocher and Dalmuir, as well as other parts of the eastern district of the county. More money will be required.

Forfar Corporation Water.—The Corporation of Forfar will apply for power to construct additional water-works, consisting of an aqueduct, conduit, or line of pipes in the parish of Tannadice, in the county of Forfar, together with the necessary subsidiary works. Provision will be made for securing the purity of the water, as well as for compensation. More money will be asked for.

Perth Gas.—The Perth Corporation desire to extend their limits so as to comprise the burgh of Perth and a number of parishes in the county, and supply gas and fittings therein. Application will be made for power to inspect electrical fittings which it is proposed to place in houses supplied by gas, and their intended location; and also to make fresh provisions with regard to the illuminating power, pressure, and quality of the gas, and for testing. Additional borrowing powers will be sought.

LEGAL INTELLIGENCE.

HOUSE OF LORDS.—Tuesday, Nov. 21.

(*Before the* LORD CHANCELLOR, *Lord* LINDLEY, *and Lord* ROBERTSON.)

Ashton Gas Company v. Attorney-General and the Corporation of Ashton-under-Lyne—Payment of Maximum Dividends Free of Income-Tax.

The question involved in this appeal was whether, on the true construction of the Income-Tax Acts and the Ashton Gas Act, 1877, the appellant Company were entitled to pay the maximum rate of dividend on their ordinary share capital free of, or less, income-tax. The Court of Appeal dismissed, with costs, the appeal of the Company against a judgment of Mr. Justice Buckley in January last year, whereby it was declared that the profits divisible in any year ought to be calculated as inclusive of income-tax.* The facts of the case were these: The capital of the Company had been increased from time to time, and now amounted to £88,509; and from 1847 the Company had paid the maximum dividend in full, without making any deduction in respect of income tax. In 1884, an action was commenced against the Company to compel them to reduce the price of gas, and prevent them accumulating a large amount of undivided profits. The Court of Appeal then decided that there was no obligation upon the Company to use their undivided profits in the reduction of the price of gas; and that no limit was set to the profits they might make, provided the dividends were reduced as the price of gas was raised, under section 17 of the Company's Act of 1877. This section set forth that the standard price was to be 3s. 8d. per 1000 cubic feet, subject to the usual sliding-scale provision of 5s. per cent. increase or decrease of dividend for every 1d. decrease or increase in the price. The price charged by the Company for the three years ending June 30, 1903, was at the rate of 2s. 4d. per 1000 cubic feet; and consequently the maximum rate of dividend payable by them during those years was 14 per cent., which had been paid. It was contended for the Company that, having regard to the provisions of the Income-Tax Acts, and of their own Acts, the income-tax was charged upon the Company and not upon the shareholders, and was payable in respect of the annual value, profits, or gains under Schedule A of the Income-Tax Act, 1853, before any distribution of dividends. The respondents submitted that the decision of the Court of Appeal ought to be affirmed, because, among other reasons, the income-tax was payable in respect of both the distributed and the undistributed profits; and the tax ought to be borne by the persons entitled to receive the distributed profits.

Mr. H. TERRELL, K.C., and Mr. W. M. CANN appeared for the appellants; Mr. DANCKWERTS, K.C., and Mr. R. J. PARKER represented the respondents.

The LORD CHANCELLOR, in giving judgment, said if it were not for the complex character of the arrangement made in connection with the collection of income-tax, such a question as that now before them would be unimaginable. The Legislature had enacted that the Gas Company should not pay to their shareholders dividends exceeding 10 per cent.; but the difficulty arose from the arrangement made for the collection of income-tax. In fact, the machinery was that the Company themselves should, for the purpose of collecting the tax, be as if they were the officers of the Government. But supposing they got rid of the machinery altogether, and instead of the Company paying the whole income-tax, each shareholder was left face to face with the collector, it would be clear that the Company could not pay more than 10 per cent.; and when they had ascertained what the 10 per cent. dividend was, they would not be at liberty to add 10 per cent. to the amount of the tax which each of the shareholders had paid. The contention of the appellants would alter the nature of profit. The profit of a company was what it earned after paying all expenses. Income-tax was charged on profit, and the thing taxed was profit; and they had no right to deduct income-tax and say that the profit was what remained after such deduction. He shared Mr. Justice Buckley's difficulty in understanding how such a plain matter had been discussed at such length. He moved that the appeal be dismissed, with costs.

Lord ROBERTSON said the whole argument of the appellants rested upon words in Schedule A read out of relation to the subject-matter of the enactment. What had to be remembered was that the schedule merely provided a formula for ascertaining income arising from ownership of land. It was an artificial and elaborate method of assessing income on what it yielded. The view of the appellants really implied that the tax under Schedule A was not income-tax at all. He was not sure that this reasoning would not lead to the shareholders having to pay income-tax over again. He entirely agreed with the judgment of Mr. Justice Buckley.

Lord LINDLEY concurred; remarking that it seemed to him that Mr. Justice Buckley's judgment was absolutely unanswered.

The appeal was therefore dismissed, with costs.

* See "JOURNAL," Vol. LXXXV., pp. 218, 279; and Vol. LXXXVI., p. 970.

Proposed Gas-Works Purchase at Wigston.

At a public meeting the ratepayers of Wigston have passed a resolution in favour of the acquisition of the gas-works, on the ground that "it would be against the best interests of the parish to lose this opportunity of purchasing the undertaking at the amount now asked by the Company—viz., £52,500, *plus* book debts and stock." Mr. Freckingham, who presided, said the question was debated ten years ago. The Gas Company then asked £52,500, which was considered too much. Last March negotiations were again opened; and the Council eventually offered £52,500, while the Company agreed to sell at this amount, *plus* book debts, &c. Only £1100 now stood between the two parties; but the Council had disagreed. He was sure the works were worth the money, and would be profitable in a short time. Mr. Warren, in seconding, pointed out that the purchase price would be about 22½ years, which was lower than in any other case in the country. Mr. Richards asserted that £55,000 would cover the purchase amount. He had made calculations which led him to estimate £2900 per annum as profits. They were seeking to break down the monopoly that had been pocketing the money of Wigston ratepayers for many years. Mr. Parker, the Chairman of the Finance Committee, said nobody could prove that a profit of £2900 could be made. He thought, quoting the Council's Solicitor, at least £57,000 would be required for purchase-money; and no advantage could accrue from the scheme. They could not reduce the price of gas, nor abolish the meter-rents. Mr. Broughton said he was an advocate for buying the works, but not at over £50,000, If concluded as now proposed, the purchase would cost £60,000. An amendment that a poll of the whole parish be taken on the question, was defeated.

High-Pressure Water for Fire Extinction.—The Metropolitan Water Board have decided that the restrictions which have hitherto prevented an extended use of the London Hydraulic Power Company's supply of high-pressure water for fire extinction will be withdrawn. In future it will be possible for anyone to have hydraulic pressure apparatus fitted, subject to the domestic water used being passed through a meter. The injector hydrant combines in one jet the force and volume of both the hydraulic power and the domestic supply.

MISCELLANEOUS NEWS.

LOCOMOTIVES AND WAGGONS ON RAILWAY SIDINGS UNDER THE FACTORY ACT.

Home Office Inquiry—The Gas-Works Case.

On Wednesday, at the Caxton Hall, Westminster, Mr. CHESTER JONES sat as Commissioner on behalf of the Home Office to inquire into objections to the new regulations for the safety of workmen employed in connection with lines and sidings under the Factory Act.

The Home Secretary, in a circular dated Oct. 27, explained the regulations. Regulations 1 (*a*) and (*c*) is to ensure that where persons employed may have to stand or pass while a locomotive or waggon is passing, there shall be sufficient space clear of any waggon and its load, fixed structures, stack of materials, or temporary deposit on the other side of them. Special consideration seems necessary also in respect of many existing structures which cannot be altered without prohibitive cost. In some of these instances, reasonable safety appears to have been secured by strict administrative regulations and supervision; but in others, dangerous conditions exist without the same care being taken. In certain cases in which continuous space at the side of the line cannot be given, places of refuge at frequent intervals, of (say) 20 yards, afford an alternative. Regulations 3 and 4 refer to two classes of cases—(1) definite and accustomed level crossings in frequent use by persons employed; and (2) the means of crossing at other points where persons employed in shunting, loading, or unloading have occasion to cross. The object of Regulation 5 is broadly that men shall not have to go between the waggons where, by the use of a coupling-pole, this can be avoided. As to Regulation 9, it appears that in some circumstances an absolute prohibition of riding on buffers would cause practical inconvenience. But there is obvious danger in the practice; and where it is allowed at all, there should be secure hand-holds, and in the case of spring-buffers there should also be provision for access and standing-place clear of the moveable parts of the buffer. The Home Secretary concluded by stating that most of the objections could be met by a public inquiry.

Mr. WILLIAM WILLS and Mr. KENNETH CHALMERS appeared as Counsel for the Home Office; and gas interests were represented as follows: Mr. E. H. LLOYD, K.C., and Mr. HAROLD W. BEVERIDGE appeared for the following Scottish municipal gas undertakings: Edinburgh and Leith Corporations' Gas Commissioners, and the Corporations of Glasgow, Dundee, Aberdeen, Perth, Greenock, and Falkirk. Mr. C. C. HUTCHINSON appeared for the Bristol Gas Company, and Mr. R. NEVILLE for the Brentford Gas Company. The South Suburban, Reading, Croydon, West Ham, Tottenham and Edmonton, and Wandsworth and Putney Gas Companies were also represented. Mr. HUTCHINSON, and Mr. T. T. BLYTH appeared for the Bromley Gas Company and the Institution of Gas Engineers; Mr. A. G. READDY, for the Hoylake Gas Company; and Mr. J. A. SIMON, for the Gaslight and Coke, South Metropolitan, Commercial, and Newcastle-on-Tyne and Gateshead Gas Companies. Mr. W. H. B. MATHER (Clerk), Mr. G. STEVENSON (Convener of the Gas Committee), and Mr. A. YUILL (Engineer and Manager), attended for the Dundee Gas Commissioners.

Mr. WILLS opened the case, setting out the reasons why the Home Secretary desired further powers to secure the safety of men in gas-works, steel-works, and places that came under the Factory Acts.

Sir *Hamilton Pym Smith*, one of H.M.'s Superintending Inspectors of Factories, was the first witness; and he was taken through the proposed regulations at great length.

Mr. HONORATUS LLOYD cross-examined witness on behalf of the Scottish Corporations; and, in reply, he said he was familiar with the operations of gas-works in various parts of the country. He knew it was necessary that they should have a considerable number of rails laid down in their works.

Mr. LLOYD: Would it not be impracticable to fence off the rails which are laid inside the gas-works?

Witness: I should say so.

In the case of small gas-works, where they had a couple of trucks a day coming in, and only a few people employed, would not the number of crossings over the line be comparatively few?—Yes.

But under Rules 3 and 4, it might be that many subways or bridges would have to be provided?—I do not think they are required. But the regulation says that you may adopt other suitable measures.

You made a report; and you thought the means adopted for safety in gas-works reasonable?—No; I thought a great many modifications of the Departmental Committee's recommendations were necessary.

For instance, where you have two matters before you—one prescribing the distance between two lines of rails and the other dealing with the distance between a line of rails and a fixed structure—you prescribe that where practicable there shall be a minimum distance?—Yes.

But, in dealing with the distance between the line and the fixed structure, you do not make that requirement?—No; because in dealing with fixed structures the conditions are entirely different. In one case it is possible without an absolutely prohibitive cost; but where you lay down a definite law with regard to fixed structures, it may mean the removal of large buildings. Where you cannot get a clearance, I think it would be far better for the rolling stock to be as close together as possible, so as not to invite people to go in between.

The COMMISSIONER: When you are talking about the distance between adjacent lines, and you use the words "reasonably practicable," I suppose you have in your mind that it would be possible to move the lines farther apart without great expense?

Witness: Yes, in some instances; but in a great many cases it would be impossible.

Mr. LLOYD: In the case of the clearance of a fixed structure, it might not be necessary to remove the structure, but it might be reasonably practicable to move the line?

Witness: Yes.

Is it the intention to include mechanical stokers in these regulations?—If there is a clearance which will allow men to pass safely on one side, not on the feeding side of the mechanical stoker, then they are not intended to apply.

There is no limitation that they shall apply in some instances and not in others?—Well, supposing the mechanical stoker is travelling along the side of the retort, in some instances there is ample clearance; but where there is no clearance and there is a wall, people would be liable to be jammed going behind the mechanical stoker, and then some provision ought to be made in the shape of refuges or safe places to allow them to pass.

But the regulation would apply equally to the retort side as to the wall in the case you have mentioned; and therefore the regulation would apply to both?—But no man in his senses would try to pass between the retort and the mechanical stoker. I would not remove the wall, but would have recesses or a sort of inlet made in the wall to allow people to pass safely.

In some gas-works there are lines running into the coal-store; the object being to carry the coal into the store and tip it up. Men have to pass by, along, or over those lines?—Yes.

Is it intended that the regulation with reference to the 3 feet between the lines shall apply to such lines as that?—The case is met, I think, by No. 1 (*c*): "Where materials are placed within 3 feet of a line of rails, and persons employed pass on foot between them and the line, such material shall, so far as reasonably practicable, have an even front." This means that there is to be a fairly smooth place which a man could walk along without stumbling over. Supposing I have a line into my coal-store, and I tip coal generally from the line into the store, it may be that men have to pass through at times, but not at the time when I have tipped.

Is it intended to apply to both these cases?—Yes.

In some instances where the line runs into the coal-store, it is the habit to tip the coals each side, and to tip them at the end and gradually to cover over the lines for many feet deep. Is it intended to prevent that?—No; I should say not.

Then something should be put in to make that clear?—Yes.

You say "gantry means an elevated structure carrying a line of rails and used for loading or unloading." Is that intended to cover a travelling crane?—No; overhead travelling cranes are exempted.

What do you mean by an overhead travelling crane?—By an overhead travelling crane, I mean that there are supports on which there are lines, and the crane moves right along running on these raised lines, just as you find in foundries and iron and steel works.

You have given a minimum width of 2 ft. 4 in. for a footway between the fence and any part of a locomotive or waggon. For instance, supposing I had a gantry which could not give, as now constructed, 2 ft. 4 in., but in order to comply with the regulations I, at great expense, altered my gantry, inasmuch as the minimum distance is measured from the waggon, if the waggon were to change in size, my gantry would be wrong, and I should have to spend my money over again. That does not seem reasonable, does it?—But I do not think you ought to be allowed to alter your plant so that it would not give sufficient clearance way for a man's safety.

Well, a gas company provide a gantry; and if the colliery owner or the railway company send in rolling-stock which varies in size, the gas company would have to increase the gantry?—But you ought not to allow the railway company or anybody else to put your man in danger by running plant which would not give a proper clearance.

Do you think that it would be reasonable that I should have a gauge for waggons at the gas-works, and that I should say, if a colliery company or a railway company sent in a waggon of a certain size, I would not have it in the place?—The object of these regulations is to protect life; and I think that anything is unreasonable which does not provide for that.

I suggest to you that, as a gas company are responsible only for the fixed structure and the fixed lines, and have no control over the size of the waggons, it is unreasonable that they should be saddled with great expense due to the changed size of waggons belonging to somebody else?—The people cannot run their waggons on to your premises without your sanction. Either you will refuse to receive waggons beyond the prescribed size, or you will have to alter your gantry so that they can be safe.

Now, Regulations 3 and 4 may be divided into an "accustomed crossing" and "a crossing that is frequently used"?—Yes.

What is the distinction between the two?—It is a very fine one.

So fine that I cannot find it. Then can you tell me why it is suggested that if there is an arbitration it should be an arbitration by an independent person appointed by the Home Office?—As a rule, if the Arbitrator is an independent person appointed by one side, it does not inspire confidence?—We want an absolutely independent opinion.

Do you not think he should be appointed in the ordinary way?—Well, the Commissioner sitting to-day is appointed by the Secretary of State; and he is not an Arbitrator on behalf of one of the parties.

Now a word as to the coupling-poles. The gas companies have to provide coupling-poles or other suitable means; and it would be our duty to see that they were used. But the railway company and the colliery proprietor who provides the waggons might furnish waggons for which the application of the poles is useless. What am I to do?—They would not be employed if they were useless.

Does it make any difference as to whether or not these regulations ought to apply to particular works where the pace at which locomotives and waggons are controlled varies?—It is certainly an element for consideration; but for administrative purposes it would be extremely difficult, and no one would agree as to what the pace was.

But taking such paces as 2, 3, 4, or 5 miles an hour, what do you say?—Well, I know a case of a man being killed in a gas-works by an automatic stoker and a vertical pillar supporting the roof, when the automatic stoker was only travelling from half to a mile an hour.

What regulation would have prevented that?—None that I know of.

That does not seem to be a very happy instance?—It shows there is danger, even when plant is moved very slowly.

The COMMISSIONER: The original regulation would have met it as first drawn.

Mr. HONORATUS LLOYD: On the question of riding on buffers there, the trucks not being mine, I cannot provide for foot-plates or hand-rails; and, therefore, if the railway company or the colliery company do not provide them, it becomes absolute, and no man must ride on the buffers?

Witness: If the railway company or the colliery company do not comply with the regulations, they must not send their plant on to your premises.

Am I to stop their waggons at my gates, and send them back again?—No; I think the people would provide what is reasonably required by the regulations.

Mr. RHODES (appearing for the Manchester and Salford Corporations with special reference to their gas-works): Do you know that the retort-houses were built for the purpose of the retorts being fed by hand labour?

Witness: I accept that.

Assuming that the retort-house was built for the automatic stoker to be used, and that it was erected with the wall at the other end, and joining a straight line, or some other property that does not belong to the Corporation, if the wall is more than 20 yards in length, how can it be possible to make recesses in it at spaces of 20 yards?—Perhaps some alternative might be put in to prevent a man being caught between the stoker as it moves along the wall.

You do not suggest that, if an alternative like that cannot be found, they should go back to hand stoking, and give up the automatic stoker?—No.

Mr. NEVILLE: Supposing trucks or waggons not worked by mechanical power are used upon a gantry, would that gantry still come within your rules?—No.

Mr. SIMON: Might not the use of long poles to couple or uncouple waggons be an actual source of danger where the waggons run into the retort-houses?

Witness: Yes.

Now about materials placed at the side of the line. Supposing the waggons come in to discharge coal, and they are lying in the gas-works to take up coke and other things, you would not expect the coal or the coke to be transferred from the ground to the waggons, or from the waggon to the ground, so as not to touch the 3 feet of open space which you require?—No; I think not.

Then you only refer to the case of stacking coal or coke?—Yes.

Mr. HUTCHINSON said he adopted the cross-examination of Mr. Lloyd so far as it related to Regulations 3 and 4; but he wished to go into Regulation 1 (*c*), which said that "where materials are placed within 3 feet of a line of rails, and persons employed pass on foot between them and the line, such material shall, so far as reasonably practicable, have an even front." He wanted to know if this regulation was framed to meet the case of materials having such a front as would oppose an obstacle to the free passage along the side of the line?

Witness: Yes.

Have you considered the heaps of materials in gas-works in the nature of coke or coal? They have not a straight-up face like pig-iron, but they have a sloping face to the front; so that the heap would have an even front, and that even front would have a sloping face?—Yes.

And the natural angle of rest which determines that heap is of such a character that men can—and, in fact, do—easily walk along the face of the front?—Speaking generally, that is so.

I suggest that you should insert after "have an even front," the words "and unless the face of such front is reasonably capable of being walked upon," so that the clause will then read: "Where materials are placed within 3 feet of a line of rails, and persons employed pass on foot between them and the line, such materials shall, so far as is reasonably practicable, have an even front; and unless the face of such front is reasonably capable of being walked upon, suitable means shall be taken to prevent danger to such persons by the provision of adequate recesses at intervals of not more than 20 yards." Would you be prepared to favourably consider these words?—Yes.

After the re-examination of the witness by Mr. WILLS, a discussion took place as to the future course of procedure.

The COMMISSIONER suggested that they might dispense with any further evidence from the Home Office; and if he heard all the ordinary factory evidence, as distinguished from that of railway companies, they should probably arrive at some drafting of the regulations, and then they could take the case of the docks and railways.

Mr. ELDON BANKES intimated that he should have to tender evidence on behalf of the dock companies.

Mr. J. D. FITZGERALD said, so far as the docks he represented were concerned, he thought the evidence of Sir Hamilton Pym Smith showed there was a basis on which a settlement might be arrived at.

The COMMISSIONER said if they took all the evidence from the Home Office and from all the rest of the parties, it would entail enormous expense and time.

Mr. ERNEST MOON said he should have to call evidence on behalf of manufacturers and steel-works.

After some further discussion,

The COMMISSIONER said he would sit on Monday and two following days, and hear the case of the railway and dock companies and the Mining Association, and then adjourn until Monday fortnight (Dec. 11) at the earliest. This would give an opportunity to the Home Office and himself to draft new regulations; and then the parties could determine how far these would meet their case.

Mr. *J. H. Wilson*, an Inspector of the Home Office for the Northumberland, Durham, and Cleveland district, was shortly examined; and the inquiry was adjourned till Monday (yesterday).

Cheaper Gas for Power at Brigg.—As the result of an application from a consumer, the Brigg Urban District Council have decided that the price of gas used for power purposes shall be reduced from 3s. 9d. to 3s. per 1000 cubic feet, with no discount. The feeling was that this concession would tend to keep other means of producing power from being introduced; but one member said he thought there should be a reduction of 3d. to the ordinary consumers.

GAS SUFFOCATION FATALITY IN NORTH LONDON.

Opening of the Inquest.

Last Friday, an inquest was opened at the Coroner's Court, Holloway Road, by Mr. WALTER SCHRÖDER, the Deputy-Coroner for Central London, on the bodies of Joseph Puller (70), Catherine Southby (46), and Nellie Southby (19), who were found suffocated at No. 46, Kingsbury Road, Ball's Pond Road, on the previous Wednesday morning, shortly before five o'clock. In addition to the three deceased, John Southby, aged 50, and his son John, aged 12, were rescued in an unconscious condition; and they are now lying at the German Hospital progressing favourably.

Mr. GILBERT S. ELLIOT (of Messrs. Robinson, May, and Elliot) appeared for Mr. and Mrs. Austin, the tenants of the house; and Mr. LUXTON (of Messrs. Bedford, Monier-Williams, and Robinson) represented the Gaslight and Coke Company.

Mr. LUXTON said he was in attendance on behalf of the Gas Company to express sympathy with the relatives of the deceased, and to render any aid he could in the inquiry.

Formal evidence of identification having been given,

Mrs. *Harriet Austin* was called, and, in reply to the CORONER, said that on the night of the 21st inst. she slept in the basement with her three daughters, and was awakened early on the morning of the 22nd by Mrs. Southby, who said there was a peculiar smell about the place. There were four gas-burners—two in one room, one in another, and one in the passage. She had a paraffin lamp for the entrance. On being aroused, she went upstairs and detected a kind of mouldy smell, something like sulphur, and thought it must be gas. She called to her son to turn off the gas at the meter (a penny-in-the-slot one); and this was done. She lighted a candle and took it up with her. Not finding anything, she returned to her room and went to bed. She woke up again about four o'clock, but seemed to go right off into a "drowse." A small lamp in the fireplace was still burning. Her little girl then awoke, and said she felt sick. She tried to get up, and witness went to her assistance; but they both fell on to the floor, and the eldest daughter, who came to their assistance, also fell. Eventually she managed to get up, and smelt something that seemed to come out of the coal-cellar. She got her daughters out. She then saw a bright light upstairs, and thought the place was on fire—the smell being worse as she went up. She reached the front room, and there saw the three dead people. They all seemed to be dressed. There was a large paraffin lamp, still burning, hanging on the wall. Mr. Harris, her next-door neighbour, took the child away to his house and restored him. The father was got out soon after; and they were both taken to the German Hospital. The smell was worse upstairs than downstairs. She never noticed any explosion or report.

In answer to Mr. LUXTON, witness said she did not know that the traffic was diverted to their street while a new bridge was being built close by.

Charles Thomas Russell, the brother of the last witness, said he was aroused, and got outside to try and find out where the gas was coming from. He lighted a match and threw it down the coal-hole, and immediately it went up with a sort of puff. The garden seemed alight. He got a bucket of water and threw it down the hole.

Kate Austin, the daughter, was called, and *Robert Harris* deposed to taking the boy into his house, and trying artificial respiration; and two constables—*Cornelius Briton* and *Charles Brown*—gave evidence as to finding the bodies, and endeavouring to restore animation.

Mr. *Mordaunt Percy Ladell*, a medical practitioner residing in the Ball's Pond Road, was then examined by the CORONER. He said he was called at ten minutes to five on the morning of the 22nd, and found there were four people on the pavement outside the house in question being attended to by the fireman, and he afterwards found three were dead. The boy was the fifth one. He had examined the bodies of the three deceased, and found nothing abnormal in their appearance. They were well nourished, and there was no injury. On a further examination of the man, he found the blood very fluid and deep coloured. It had not clotted. The internal organs were all deeply congested, with the exception of the brain. The right side of the heart was full of blood; but the left side was empty. He found death was caused by suffocation. He would not go so far as to say by gas poisoning, but simply suffocation. He had no doubt it was poison by gas, but the *post mortem* examination did not tell him that. In conjunction with the other evidence he should say it was suffocation by coal-gas poison.

The CORONER: To be quite technical, carbon monoxide and carbon dioxide gas.

Witness: Coal gas is, I think, the way of putting it. I do not think it was quite either.

Mr. *Thomas Carey Barlow*, the Police Divisional Surgeon, said he had seen the bodies of the deceased, and was present at the *post mortem* examination. He agreed with Dr. Ladell that the cause of death was suffocation. He had no doubt that it was due to gas poisoning—carbon monoxide and carbon dioxide. The appearance of the women was the same as that of the man.

The fireman having been called,

Henry Woolvett said he was a service layer in the employ of the Gas Company, and was instructed at seven o'clock on the morning of the 22nd to go to Kingsbury Road, with three other men, to open the ground. After working for three hours, he discovered a broken main. It was broken right round—a clean break. The size of the pipe was 3 inches. He saw no reason for the breakage, unless it was on account of the weather. The ground was level in the ordinary way, and the pipe was laid in general road soil. [Two pieces of pipe were produced, showing a clean break.] They opened 30 feet of the roadway before the break was found. The depth of the main was 2 ft. 2 in.

The CORONER remarked to the Jury that he thought it was better, if possible, that the evidence of the man and the boy, now lying in the hospital, should be taken, as well as that of the Divisional Engineer of the Gas Company and of the District Inspector.

The inquiry was accordingly adjourned till Friday, the 8th prox.

THE GAS SUFFOCATION CASE AT SEAFORTH.

A Coroner on Water Gas and Fittings Inspection.

At Seaforth, on Monday of last week, an inquest was held by the County Coroner (Mr. S. Brighouse) on the bodies of Ann Stringer, aged 80, and Robert Bradley, aged 20 months, who, as already briefly recorded in the "JOURNAL" (*ante*, p. 562), were found dead in two bedrooms of a house at Seaforth, near Liverpool. The father and mother of the child, and another infant, were also overcome; but happily they recovered.

The first witness was a daughter-in-law of Mrs. Stringer, who said the occurrence took place in a six-roomed house, and altogether there were six gas-jets, which were supplied through an automatic meter. She had frequently smelt gas in her bedroom, but had failed to locate the leakage. The father of the child who died said he had slept for three nights in the bedroom with his wife and two children. The windows and door were kept closed. He noticed a slight leakage of gas each morning he got up; but it had no effect upon any of them. A piece of the lead piping from this room was produced; and a flaw in it from which the escape arose was pointed out to the Jury.

The medical evidence was opened by Dr. V. Glover, who said the cause of death was asphyxia, due to the carbon monoxide contained in the gas. The gas supplied was a mixture of carburetted water gas and coal gas. Such a gas contained usually 14 to 16 per cent. of carbon monoxide. The next witness—Dr. German, the Police Surgeon—stated that an official analysis of the gas had been taken on various occasions from 1899 to 1903. A sample of the gas in the house had been obtained; but the analysis was not yet complete. The point of interest was that, while the average amount of carbon monoxide in coal gas would vary from 4 to 12 per cent., in carburetted water gas it might be anything up to 30 or 35 per cent. It was admitted by a report of a Government Committee that there was an increased danger of leakage from carburetted water gas, because, in addition to its containing more carbon monoxide, it had no smell such as coal gas.

The Coroner, in summing up, observed that the Liverpool Gas Company should so manufacture gas that there should be a pungent and distinct odour about it, so that if it escaped people would smell the fumes. He could not believe that the gas which came from the break in the pipe in Mrs. Stringer's house gave out any odour at all, because if it did the flaw would have been detected long ago. He considered local authorities ought to be equipped with more powers than they had to see that gas pipes and fittings were fixed in dwelling houses in a proper manner.

The Jury, after deliberating, returned a verdict of "Accidental death," and recommended that the District Council should be empowered to inspect gas pipes and fittings in all dwellings houses, and, further, that the Liverpool Gas Company should state as a fact to all the consumers that there was water gas in their gas supply where such was the case.

PRICE OF GAS TO MANUFACTURERS IN BIRMINGHAM.

The "Birmingham Post" states that the Gas Committee have prepared a report for presentation at the meeting of the Council on the 5th prox., containing a most important recommendation relating to a reduction in the price of gas for motive power purposes. On July 25 last, the Committee recommended the Council, in view of the charges made by other undertakings then cited, and of the manufacture of a gas that could under favourable conditions displace town gas, to sanction all gas used in engines, irrespective of the quantity being supplied, at the lowest rate then current—viz., 1s. 10d. per 1000 cubic feet—and this was agreed to. Considerable development in the perfecting and in the manufacture of gas-producer plants has recently taken place; and the attention of Birmingham manufacturers has been directed to the cost at which such gas can be produced, with the result that a number of the plants have already been supplied to manufacturers within the Birmingham area of supply. The quantity of gas supplied by the department for use in engines is approximately 960 million cubic feet per annum, or about 15 per cent. of the total quantity sold during the year ended March 31 last. Apart from the loss in income that the department would sustain should producer gas be substituted for a large proportion of this output, it is important to remember that the principal mains in the city are now employed for conveying gas for sixteen hours during each working day; whereas their use would be much more restricted, and the expenses thereon proportionately greater, if gas were mostly used for illuminating purposes only. And similarly the effect on all other fixed or dead charges would be adverse to the profit-earning capacity of the undertaking if the business in power gas were unduly limited. The effect of the recommendation contained in the last report presented by the Committee to the Council was to secure to users of smaller quantities of gas for power purposes reductions in price from 2s. 6d., 2s. 3d., and 2s. to 1s. 10d. per 1000 cubic feet; and no reduction was then made in favour of the larger consumers of gas for motive power. The Committee, having examined the position from all points of view, are of opinion that the price of gas for motive power should be further reduced, and therefore recommend that, from and after the Christmas quarter index reading of the meters, the following charges shall be made for gas used exclusively for motive power purposes: On consumptions in one premises of under 100,000 cubic feet per quarter, 1s. 10d. per 1000 cubic feet; and over 100,000 cubic feet per quarter, 1s. 7d. per 1000 cubic feet, less the usual discount of 5 per cent. for prompt payment. If the recommendation of the Committee is approved, manufacturers affected by the reduction will derive the benefit thereof in the accounts rendered for the quarter ending March next.

Dunmow Water Supply.—A scheme for the supply of water to Dunmow, prepared by Mr. Mackenzie Richards, which is estimated to cost £5000, has been approved.

CONTINENTAL UNION GAS COMPANY, LIMITED.

Annual Report.

The following report of the Directors of the above-named Company for the year ended the 30th of June—the first to be issued—will be submitted, with the accounts for this period, to the proprietors at the ordinary general meeting to be held on the 12th prox.

At Messina and Montargis (the two stations owned by this Company) the increase in the number of consumers has been nearly 6 per cent., and in the quantity of gas sold 3 per cent. In January last, an agreement was signed by which the Municipality of Messina undertook to pay off, by quarterly instalments, the balance of their indebtedness for public lighting up to the previous 31st of October. The Directors regret that so far the instalments due have not been punctually paid; interest on the same at 4 per cent. is meanwhile accruing.

As regards the Union des Gaz, the private consumers have increased by 12,756—making a total number of 197,140; and the public lamps by 855. The total quantity of gas sold shows an increase of nearly 6 per cent. over last year. The mileage of mains has been increased by 30; making a total of 909 miles on the 30th of June.

During the year under review, the Union des Gaz has renewed the concessions of Louveciennes and Vaucresson, two communes near Paris, and has recently secured concessions for the supply of gas to the communes of Sartrouville and Maisons Laffitte. All these communes will be supplied from the new works at Nanterre. The Union des Gaz has also obtained a concession for 27½ years from the 1st of July last for lighting Kehl—a town on the Rhine near Strasburg. Notwithstanding the continued increase of debenture interest and debenture redemption, following upon expenditure on capital account necessitated by the extension of their works, the net results of the year have enabled the Union des Gaz to maintain the same dividend as last year.

Reverting to the Continental Union Gas Company, the Directors have to report that, since the last ordinary general meeting, acting under the advice of the Company's Solicitors, new Articles of Association were submitted to the proprietors and passed at an extraordinary general meeting on the 6th of June last, and duly confirmed at a subsequent meeting on the 21st of the same month. The £60,000 of the Company's stock which the Board were authorized, at the extraordinary general meeting held on the 6th of June last, to dispose of, has been allotted to the stockholders at £102 per cent.

From the accounts it will be seen that £3960 has been charged for amortization of the Messina and Montargis works, and the reserve fund increased to £40,000, which sum is invested in first-class securities. The capital outlay at Messina, after the usual amortization and a special depreciation this year, has been reduced to £85,847 2s. 9d. The net balance available is £67,462 11s. 9d., out of which the Directors recommend a dividend for the year of 6½ per cent. (being at the same rate as last year) on the ordinary stock, free of tax, and of 7 per cent. on the preference stock, less tax, carrying forward £3962 11s. 9d. to the profit and loss new account. It is proposed to pay the final dividend of 3¼ per cent. on the 4th of January next, as usual.

The Directors have the pleasure of announcing that Mr. A. F. Phillips, M.Inst.C.E., has accepted a seat on the Board. The Directors who retire by rotation are Arthur Lucas, Esq., and R. Hesketh Jones, Esq., and the Auditors are A. T. Eastman, Esq., and C. P. Crookenden, Esq., F.C.A., who, being eligible for re-election, offer themselves accordingly.

ORIENTAL GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Wednesday, at the London Offices, Finsbury House, Blomfield Street, E.C.—Mr. R. HESKETH JONES in the chair.

The SECRETARY (Mr. H. J. Luff) having read the notice calling the meeting, the Directors' report and the statement of accounts were taken as read.

The CHAIRMAN said he need hardly say that it gave him the greatest pleasure to propose the acceptance of the report and accounts. The report alluded to the expansion of the Company's business, which, he was sure the shareholders would all agree with him, was very gratifying. In November, 1903—two years ago—he referred to the resignation of Mr. Coats Niven, and the appointment of Mr. Watson, as the Engineer and General Manager of the Company. He then stated that Mr. Watson would be assisted by three Englishmen, and that with four Englishmen in their service at Calcutta, the Directors looked forward to increased business, and more satisfactory results than had been attained in the past. Their anticipations had been realized. They were now sending out a fifth Englishman as foreman of the works under the General Manager and Assistant-Manager; and when one considered that their officers had under them about 1100 natives of India of different classes, one could realize the desirability of having reliable supervision, in the interests of both employees and employers. At the meeting last year, he mentioned that the mains and distributing-pipes, as well as some portions of the works, had come into Mr. Watson's hands in an unsatisfactory condition. He (the Chairman) was glad to say all this had been remedied. During the past two years, several miles of mains had been laid and all defective pipes removed. Last year, too, he alluded to the intention of the Directors to create an insurance fund. On reconsideration, the new fund had been named a contingency fund, and would be available, not only for insurance against fire, accidents, storms, and tempest, but also for extraordinary renewals and expenditure. This contingency fund stood at £11,000 on June 30 last, of which £6000 was invested in marketable securities; but since that date the remaining £5000 had also been invested. The accounts were so clear that they needed no further explanation from him. The report alluded to the recent visit to England of Mr. Watson. It gave the Directors much pleasure to have him present at their Board meetings; and he (the Chairman) also saw Mr. Watson at other times. He

found him most zealous in furthering the interests of the Company; and, to sum up very briefly, one might safely say (he did not think he could say much more or anything less) that he was "the right man in the right place." In the forthcoming year, it would be necessary to augment the gasholder storage, to meet the increased demand for gas. This was under their consideration, and he hoped the Chairman at the next annual meeting might be enabled to report favourably on this extension of the Company's plant. During the past year, a small gasholder had been erected to supply a district which hitherto had been subjected to tidal influences. The result had been most satisfactory, and a constant supply of gas had been maintained in that locality. At length the Company were making sulphate of ammonia. Their late Manager's attention to this was frequently urged by the Board; and, with the change of management, the ammoniacal liquor was now utilized and converted into a marketable product. The General Manager reported that the boilers, engine, and exhauster sent to Calcutta during the past year were working extremely well; that the new retort-house and regenerative furnaces showed good results: and that the system would be extended during the current year. Mr. Watson, in concluding his annual report, said: "The works generally are greatly improved, and while there remains much to be done, the more important extensions have been completed, and the Chairman and Directors have given most careful attention to our requirements. We feel that our efforts are ably supported; and we have knowledge that a three-stranded cord is not easily broken. The Chairman and Directors, the Secretary and staff, and the General Manager, staff, and workmen working together to one end, must lead to success. I have the greatest pleasure in acknowledging the assistance I have so cordially received on all hands." The Chairman concluded by formally moving the adoption of the report and accounts.

Mr. H. D. ELLIS seconded the motion.

Mr. EDWARD CLARK said he and all the other shareholders must be satisfied with the administration of the Company, because they must see that the concern was generally ordered, and their affairs marshalled, in a way that made for their true interest. He advised the Board not to put by too big reserves, as they had all known cases of this kind of thing exciting cupidity. (Laughter.) However, he had no doubt the Chairman would come to the shareholders at some future time, in his own genial way, and tell them that the Board had allowed these large accumulations, and that they thought it their duty to restore them to the shareholders. The Chairman had spoken of the reserve fund being invested in marketable securities. Seeing that this was money which they knew they were putting by in their true interests, he should like to know what were those "marketable securities."

The CHAIRMAN pointed out that the report stated they were "first-class marketable securities."

Mr. CLARK said that such a phrase was commonly used at public meetings. In connection with one Company who had funds invested in so-called "first-class marketable securities," he found they were in brewery preferences; and before they could get back the money they lost some 40 per cent. It was true the Chairman had given them his personal assurance, but why should the shareholders not know where their own money was put—whether in Consols, India Threes, or other securities? As regards the quantity of gas sold per ton of coal carbonized, that surely was information that might well be given. Many of them were fairly good gas experts, and so would like to know how much gas was brought into account per ton of coal. He did not ask for a detailed account of the working, as that would not be in their true interest. The Chairman had also spoken of the Board having sent out a foreman. A foreman was the first man who came into contact with labour; and the real administration of the labour came very much from the foreman. No doubt the Board had made a wise selection; but the shareholders would like to know something about the antecedents of the foreman. He (Mr. Clark) congratulated the Board upon this year being such a successful one; and said he hoped the time would not be long deferred when the shareholders would have the privilege of having something further in the way of dividend.

Mr. LOUIS PENNY remarked that the Chairman had mentioned a contingency fund which was for the purpose of insurance. He should like to know whether the works were insured, or were they only dependent upon this contingency fund.

The CHAIRMAN replied that it was so. It was not English policy to insure gas-works, except in perhaps some small respects.

Mr. PENNY said that the Bombay Gas Company insured their works. He also hoped that, with a large reserve fund and a contingency fund, the Board might, in view of the profits they were earning, soon be able to increase the dividend to over 8 per cent. He likewise congratulated the Directors on the very fine balance-sheet they had presented.

The CHAIRMAN said that personally he did not think the time had yet arrived when they should increase the dividend; and for these reasons: If the shareholders looked at the amount that had been expended upon the works, and if they knew the quantity of coal that was carbonized, they would find that the capital account was very high. It had been the object of the Board for some few years past to get the capital reduced; and they were reducing it now, because they were charging nothing to this account. He thought it was susceptible of still further reduction, until they got the account down to a reasonable sum. For the purpose of the stability of the Company (which he preferred to big dividends), it was not desirable, in his opinion, nor in the opinion of his colleagues, to increase the dividend at any rate for the present. With reference to Mr. Clark's request for a detailed statement of securities, he thought it was somewhat unusual to give such a statement in the report; but, if Mr. Clark, as a member of the Stock Exchange, desired to criticize in the slightest degree the Company's investments, the Board would be happy indeed to get his advice. And if they had placed the funds in securities that did not meet with the approval of Mr. Clark, they would be happy to consider his suggestions as to changing them. The Secretary would be pleased to give all the information desired; but the Board did not think it desirable to publish it in the accounts.

Mr. CLARK remarked that that was quite sufficient.

The CHAIRMAN (proceeding) said Mr. Clark also made a cogent remark about what was customary in English gas-works, in respect of stating, in the report or in the Chairman's remarks, what was the quantity of gas produced and sold per ton of coals carbonized. He must remind the shareholders that their works were not in England; and they were not using English coal. They were using the coal they had in India. It gave a very good quality of gas; but it did not yield very much. To issue the working results to an outsider who would not consider these circumstances, but who would compare the results with English statistics, or even with the statistics of a company he (the Chairman) was connected with in France, would be very much to the detriment of the Company—inasmuch as they would show they were not

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 597.

Issue.	Share.	When ex Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
570,000	10	Oct. 13	10½	Alliance & Dublin 10 p.c.	21—22	−½	4 15 5
160,000	10	,,	7½	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	Nov. 15	7	Bombay, Ltd.. . . .	6¾—7¼*	+¼	4 16 7
40,000	5	,,	7	Do. New, £4 paid	5—5½	..	5 1 10
50,000	10	Aug. 31	14	Bourne-) 10 p.c. . .	29—30	..	4 13 4
51,810	10	,,	7	mouth Gas) B 7 p.c. .	17—18	..	3 17 9
53,200	10	,,	6	and Water) Pref. 6 p.c.	15½—16½	..	3 12 9
380,000	Stk.	Aug. 16	12½	Brentford Consolidated	258—263	..	4 15 1
300,000	,,	,,	9⅜	Do. New . . .	197—202	..	4 14 1
90,000	,,	,,	5	Do. 5 p.c. Pref. .	125—130	..	3 16 11
206,250	,,	June 15	4	Do. 4 p.c. Deb. .	103—106	..	3 15 6
220,000	Stk.	Sept 15	11½	Brighton & Hove Orig.	220—225	..	5 0 0
246,320	,,	,,	8½	Do. A. Ord. Stk. .	160—165	..	5 0 0
400,000	20	Sept. 28	10	British	42¾—43¼	..	4 11 11
100,000	Stk.	Aug. 16	6	Bromley, Ord. 5 p.c. .	120—123	..	4 17 7
165,700	,,	,,	4½	Do. do. 3½ p.c. .	90—93	..	4 16 9
500,000	10	Oct. 13	7	Buenos Ayres (New) Ltd.	12½—13	..	5 7 8
250,000	Stk.	June 29	4	Do. 4 p.c. Deb. .	96—98	..	4 1 8
150,000	20	July 13	8½	Cagliari, Ltd.	24—26	..	6 6 11
100,000	10	Sept. 28	10	Cape Town & Dis., Ltd.	17—17½	..	5 14 3
100,000	10	Oct. 27	4½	Do. 4½ p c Pref.. .	10—10½	..	4 5 9
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	June 29	4½	Do. 4½ p.c. Deb. Stk	102—104	..	4 6 7
1,434,680	Stk.	Aug. 31	5½	Commercial 4 p.c Stk. .	116—118	..	4 8 1
560,000	,,	,,	5	Do. 3½ p.c. do. .	113—115	..	4 6 11
450,000	,,	June 15	3	Do. 3 p.c. Deb. Stk.	86—88	..	3 8 2
800,000	Stk.	,,	£6	Continental Union, Ltd.	128—131	+2	4 19 3
200,000	,,	,,	7	Do. 7 p c Pref.	145—150	+5	4 13 4
424,070	Stk.	—	£2	Derby Con. Stk. . . .	..	..	—
55,000	,,	June 3	4	Do. Deb. Stk. . . .	—	..	—
486,090	10	July 28	11	European, Ltd. . . .	22—23	+½	4 15 8
354,060	10	,,	11	Do. £7 10s. paid	15—16	+½	5 3 2
15,223,235	Stk.	Aug. 16	4½	Gas-) 4 p.c. Ord. . .	101—102	+½	4 6 3
2,600,000	,,	,,	3½	light) 3½ p.c. max. .	50—92	..	3 16 1
3,799,735	,,	,,	4	and) 4 p.c. Con. Pref.	110—113	..	3 10 10
4,193,975	,,	June 15	3	Coke) 3 p.c. Con. Deb.	86—88	..	3 8 2
258,740	Stk.	Sept. 15	5	Hastings & St. L. 3½ p.c.	98—101	..	4 19 0
70,000	10	Oct. 13	11	Hongkong & China, Ltd.	19½—20½	..	5 7 4
3,800,000	Stk.	Nov. 15	10	Imperial Continental .	233—236*	+14	4 4 9
473,600	Stk.	Aug. 16	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Aug. 31	6	Lea Bridge Ord. 5 p.c. .	123—128	..	4 13 9
561,000	Stk.	Aug. 16	10	Liverpool United A . .	234—236	..	4 4 9
718,100	,,	,,	7	Do. do. B . .	172—174	..	4 0 6
306,083	Stk.	June 29	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5	,,	5	Malta & Medn., Ltd. .	4¼—5	..	5 0 0
560,000	100	Oct. 2	5	Met. of) 5 p.c. Deb..	100—102	..	4 18 0
250,000	100	,,	4½	Melbourne) 4½ p.c. Deb.	103—102	..	4 8 3
541,920	20	Nov. 15	3½	Monte Video, Ltd. . .	1.½—12½	..	5 12 0
1,565,892	Stk.	July 29	4½	Newc'tle & G'tesh'd Con.	107—108	+½	4 5 8
406,025	Stk.	June 29	3½	Do. 3½ p.c. Deb.	99—101	..	3 9 4
15,000	10	Aug. 31	10	North Middlesex 10 p.c.	18½—19½	..	5 2 7
52,940	1.	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	May 12	8	Oriental, Ltd. . . .	151—154	+1	5 3 11
600,000	5	Sept. 14	7	Ottoman, Ltd. . . .	6—6½	..	5 7 8
168,255	Stk.	—	6½	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6	Primitiva Ord. . . .	7—7¼	..	4 2 9
796,980	5	July 28	5	Do. 5 p.c. Pref. .	5⅞—5⅞	..	4 13 0
488,900	100	June 1	4	Do. 4 p.c. Deb. .	98—100	+1	4 0 0
851,070	10	Oct. 13	7	River Plate Ord. . . .	12⅜—13¼	..	5 5 8
300,000	Stk.	June 29	4	Do. 4 p.c. Deb. .	96—98	..	4 1 8
250,000	10	Sept. 28	7	San Paulo, Ltd. . . .	13—13½	..	5 3 8
70,000	50	July 1	5	Do. 5 p.c. Deb. .	51—53	..	4 14 4
135,000	Stk.	Sept. 14	10	Sheffield A	244—246	+1	4 1 4
209,984	,,	,,	10	Do. B	244—246	+1	4 1 4
523,498	,,	,,	10	Do. C	244—246	+1	4 1 4
126,106	Stk.	Aug. 31	5½	Shrewsbury Ord. 5 p.c.	104—106	..	5 3 9
70,000	10	Sept. 28	10	South African	15½—16¼	..	6 1 3
6,250,000	Stk.	Aug. 16	5½	South Met., 4 p.c. Ord.	132—134	+1	4 2 1
1,895,445	,,	July 13	3	Do. 3 p.c. Deb.	87—89	..	3 7 5
575,000	Stk.	Aug. 16	5½	S'th Suburb'n Ord. 5 p.c.	123—126	..	4 7 4
60,000	,,	,,	5	Do. 5 p.c. Pref. . .	125—150	..	3 16 11
112,533	,,	July 13	5	Do. 5 p.c. Deb. Stk.	132—137	..	3 13 0
502,310	Stk.	Nov. 15	5	Southampton Ord. . . .	109—112*	..	4 9 3
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Aug. 31	6¾	Tottenham) A 5 p.c. .	122—125	..	5 0 0
363,220	,,	,,	4¾	and) B 3½ p.c. .	96—99	..	4 16 0
125,000	,,	June 23	4	Edmonton) 4 p.c. Deb.	105—108	..	3 14 1
182,380	10	June 15	8	Tuscan, Ltd.	9⅜—10¼	..	7 16 1
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
50,000	Stk.	Aug. 16	7⅜	Wands-) A 5 p.c. . .	—	..	—
255,636	,,	,,	6¾	worth) B 3½ p.c. . .	137—140	..	4 9 3
60,000	,,	,,	5 17/20	and) C 3½ p.c. . .	113—116	..	4 13 6
57,564	,,	June 29	3	Putney) 3 p.c. Deb. Stk.	82—85	..	3 10 7
745,872	,,	Aug. 16	5	West Ham 5 p.c. Ord. .	106—108	+1	4 12 7
185,000	,,	,,	5	Do. 5 p.c. Pref. . .	123—126	..	3 19 4
193,300	,,	June 29	4	Do. 4 p.c. Deb. Stk.	104—109	..	3 13 5

Prices marked * are "Ex. div." † Next dividend will be at this rate.

selling so much gas per ton as English companies, in view of the fact that they had not the same material with which to work. It was not therefore necessary, expedient, or desirable that they should publish the information. It was, he thought, sufficient for the shareholders to have what they saw in the revenue account. Of course, the coal was proportionately cheaper than British coal. With regard to the foreman, he hardly thought it was a fair thing for a shareholder to ask the Directors to publish the antecedents of a man who, in the exercise of their judgment, was selected to go out to Calcutta. It would be unfair to the man, and certainly the question rather implied that the Directors did not know their own business.

Mr. CLARK said he had looked at the matter from quite another point of view, and the one suggested by the Chairman did not occur to him.

The motion was then unanimously carried.

The CHAIRMAN next proposed the declaration of a dividend of 8 per cent. per annum (less the interim payment of 3½ per cent.), free of income-tax, and payable on Dec. 4.

Mr. H. D. ELLIS, in seconding, referred to the question that had been raised as to an increase in the dividend. He said there was not a man in the City of London who knew more about Stock Exchange matters than Mr. Clark; and he would confirm him (Mr. Ellis) in this, that among the factors which strengthened the position of a stock in the market, there was not one of greater value than the knowledge that a company possessed large reserves, to which it might resort in the case of any unforeseen accident befalling it, and which therefore guaranteed the steadiness of the dividend, which might otherwise be diminished owing to an accidental loss.

The proposition was unanimously passed.

Moved by the CHAIRMAN, and seconded by Mr. W. WILLIAMS, Mr. Robert Miller was re-elected a member of the Board; and, on the motion of Mr. MILLER, seconded by Mr. A. T. EASTMAN, the Chairman was also returned to his seat at the Board.

Mr. LOUIS PENNY proposed, and Mr. BERTRAM ELLIS seconded, the re-appointment of the Auditors; and this was also agreed to.

Mr. CLARK then moved a vote of thanks to the Chairman and Directors for their efficient services during the past year. The Board, he said, had been unwearied in their labours on behalf of the shareholders, and more especially during the last three years since the renewal of the contract; and the capital had also been put on a more satisfactory basis. He should like to join to the vote Mr. Watson (their very efficient Manager) and his staff, as well as Mr. Luff and his staff in London.

Mr. PENNY seconded the motion, and it was cordially passed.

Both the CHAIRMAN and the SECRETARY made response; and the proceedings then terminated.

In view of the increasing demands made upon them for water, the Burnley Corporation are proposing to increase their resources by the construction of a new reservoir, at a cost of £100,000, at Robin Hood, on the moors dividing Lancashire and Yorkshire.

BINGLEY AND THE WILSDEN GAS SUPPLY.

The Suggested Purchase.

To assist them in coming to a decision in reference to the proposal to purchase from the Bradford City Council for £19,500 the right of supplying Wilsden with gas, the Bingley Urban District Council have obtained a lengthy report from their Gas Engineer, Mr. E. H. Swain. This states that the plant in the Wilsden area consists of the mains, a gas-engine and exhauster for the purpose of drawing the gas required from Clayton, a holder having a capacity of 100,000 cubic feet, and a governor for regulating the pressure at which the gas is sent out to the consumers. The gas is drawn from Clayton to the holder through a 10-inch main, and is supplied to the village through a main which, commencing at 8 inches, diminishes in size as it approaches the outskirts of the area of supply. The quantity of gas used at Wilsden during the year ending March 31 last was 7,045,000 cubic feet; and allowing for leakage at the rate of 6 per cent., this was equal to a total production of about 7,500,000 feet per annum, or about 41,000 feet per day. This, if the experience at Cullingworth (when the Council purchased the gas-works) should be repeated, might be expected to increase to 55,000 or 60,000 cubic feet per day. Having regard to the fact that the plant at the Bingley Gas-Works is of a very old type, and insufficient to meet the demands which have already been made on it, Mr. Swain is of opinion that it would not be sound policy to put upon it the additional burden of supplying Wilsden with the daily quantity named. The Cullingworth plant has not been fully worked; but there are objections to the suggestion that the gas for Wilsden could be made at Cullingworth. The chief of these is that the cost of manufacturing there is greater than at Bingley.

Turning to the financial side of the proposal, Mr. Swain says that, allowing £3000 for the cost of a main from Bingley or Cullingworth to Wilsden, and adding this to the purchase price, there would be an outlay of £22,500. The annual repayment to sinking fund for this capital sum, on the basis of borrowing powers being granted for 40 years, which was not at all certain, would be £562; while the annual charge for interest, at 3¾ per cent., would be £844, or a total annual charge of £1406. The gas sold at Bingley during the year ended March 31 last was 96,630,300 cubic feet, and at Wilsden 7,045,000 feet, giving a total of 103,675,300 feet. On this, an increase in the price of gas, less the usual discount of 15 per cent. of 3d. per 1000 cubic feet, would yield £1102; at 4d., it would yield £1469; and at 5d., £1836. Allowing the proper proportion of fixed charges which had already to be paid against the consumption of Wilsden, would reduce the amount which would have to be raised by an increase in the price of gas by £122, and bring it down to £1284. Assuming that the gas was increased 4d. per 1000 cubic feet in price in order to meet the extra annual payment, the Bingley gas would be brought up to 2s. 9d. gross, or 2s. 4d. net. At present the Wilsden gas consumers are charged 2s. 9d. per 1000 feet,

Of course,

You Know this Radiator.

The "St. Andrew."

Everybody knows it,

and the flood of orders
that is daily pouring in
. . on us proves that . .

Everybody wants it.

It will pay you
to put it ON HIRE.

John Wright & Co.,
Essex Works,
Birmingham.

less 5 per cent. discount, equalling a net price of 2s. 7½d. They would therefore obtain a reduction in price of 3⅜d. per 1000 feet, which, on the basis of the present consumption, would mean a saving of £103 for the whole of the consumers. In conclusion, he mentions that the present capital debt on the gas-works at Bingley and Cullingworth is £20,145. If the Council decided to buy the Wilsden supply, the capital debt would be more than doubled; and not for eleven or twelve years would the Council be again in the same favourable position as now with regard to a low capital account.

COMPETING FOR GAS CUSTOMERS IN AMERICA.

Free Gas and Grocery Premiums.

A correspondent has forwarded to us a cutting from an American paper giving an account of what is probably a unique example of competition for gas business. We reproduce it exactly as it was received from the other side.

Sapulpa, 12 miles west of Tulsa (I.T.), is in the throes of a rate war between two rival Gas Companies that has reached a stage where not only is gas furnished by them free to all who will tap their mains, but, in addition, premiums are offered to every patron; one Company giving away a pound of the best coffee in the market, and the other a dollar's worth of granulated sugar. The concerns at war are the John Smith and the Sapulpa Oil and Gas Companies. Both are strong financially. John Smith, the President and principal stockholder of the Company bearing his name, is one of the largest oil and gas producers in the Indian Territory fields. In his operations at Sapulpa, it is alleged, he has the backing of the Standard Oil Company. The Sapulpa Oil and Gas Company have a paid-up capital stock of $1,500,000; and at the head of it are Mayor Watchorn and J. S. Skelton, two of the wealthiest citizens of Sapulpa. Both Companies are operating under municipal franchises, with equal provisions, granted some four months ago. The Companies were at swords' points at the very beginning. The fact that the Mayor of the city was heavily interested in one Company was sufficient to start trouble. First there was a cut in the price of gas by one, and then an under-cut by the other. The fight continued along this line for three weeks, when the John Smith Company came out with an offer of free gas, which was announced through the local papers in full-page advertisements and by individual letters. The following day the Sapulpa Oil and Gas Company made a duplicate offer of free gas, with the addition of a premium—a pound of coffee. The John Smith Company then raised the bid with the granulated sugar offer. What adds to the bitterness of the struggle is the shortage of gas in the Sapulpa field, caused by salt water in the wells. Recently the Sapulpa Oil and Gas Company were forced to make a deal for gas with a Tulsa Company, for which a good price is paid. The fight between these two Companies has entered every avenue of life in Sapulpa.

METROPOLITAN WATER BOARD.

The Lea Valley Works.

At the Fortnightly Meeting of the Board held on Friday—Sir R. M. Beachcroft in the chair—a long report was presented by the Finance Committee on the proposed works in the Lea Valley, in respect of which the Board intend to apply for parliamentary powers. After some introductory remarks, the Committee dealt with the subject under two heads; reviewing first the works undertaken or contemplated by the Water Companies, and then considering the proposals for the removal of the Board's eastern intake, and for the interception and treatment of the sewage of certain districts in the Lea Valley. These works are estimated to cost £685,000, made up as follows: Main sewer, £125,000; sewage-disposal works, £50,000; aqueduct, £450,000; and River Lea diversions, £60,000. In the course of their report, the Committee stated that, apart from the question of the relationship of the Local Authorities to the Board's scheme, they were decidedly of opinion that, as a source of water supply, the Lea had suffered from the fact that the Board's intake at present is below the point where the War Office gunpowder works discharge, as it had been said for some years that the refuse from these works had contributed greatly to the pollution of the river. There was, however, in their minds one great difference between the Government's explosive works and the sewage works of the Local Authorities. The latter had no choice of location. In the case of the Government works, however, the circumstances were altogether different; and the Committee were of opinion that it was a public scandal that the Government should have placed works on the banks of a river within a few miles of London without taking any effective precautions against the pollution of a stream from which about one-fourth of its water was drawn. In fact, the State itself imperilled the health of the Metropolis. The Lea Conservancy put before the Royal Commission on Sewage Disposal a scheme known as the "Lea and Stort Valleys Main Sewage and Sewage Disposal Scheme;" and they anticipated that the War Office would contribute towards the capital cost of the works, and pay an annual amount towards the working expenses. The Committee were of opinion that the whole of the facts should be laid before the Government, in order that they might make a contribution, by way of a capital sum, towards the cost of the contemplated scheme, and an annual payment towards its maintenance. The Committee requested the Chief Engineer (Mr. W. B. Bryan, M.Inst.C.E.) to place before them an estimate of the cost of the sewage-disposal works and of the annual outlay which would be incurred in the treatment of the sewage of the authorities referred to, including the borough of Hertford; and it was as follows: Interest and sinking fund charges, £2392; working expenses, £3655—total, £6047. The Committee concluded by recommending—"That the facts connected with the proposed scheme be laid before the War Office authorities, and that they be invited to make a contribution towards the cost of the intercepting sewer and sewage works, and contribute an annual sum towards the maintenance thereof."

CARBURETTED WATER-GAS APPARATUS

Merrifield—Westcott—Pearson Patents.

The Economical Gas Apparatus Construction Co., Ltd.

W. H. PEARSON, Chairman.
W. H. PEARSON, Junr., Deputy-Chairman.
J. T. WESTCOTT, Manager.
L. L. MERRIFIELD, M.Inst.M.E., Engineer.

London Offices: 19, ABINGDON STREET, WESTMINSTER, S.W.
American Offices: TORONTO. TELEGRAPHIC ADDRESS: "CARBURETED, LONDON."

CARBURETTED WATER-GAS ENGINEERS.

The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	TONBRIDGE	300,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND, IN ADDITION, 8,150,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

To this recommendation Mr. E. White moved the following amendment: "That it be an instruction to the Works and Stores Committee to consider the statement in the report of the Finance Committee affecting the alleged pollutions on the part of the gunpowder factories at Waltham Abbey, and to report thereon at the next meeting of the Board, and also as to the desirability of inviting the War Office authorities to contribute to the cost of the present scheme." He considered that the statements in the report were somewhat exaggerated; and if the Board proceeded on those lines, they would raise a strong opposition against them from a quarter from which they ought to expect support, as well as damage their prospects of passing their Bill relative to the proposed new works. On being put to the meeting, the amendment was lost, and the recommendation was adopted.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

In consequence of complaints made in the Town Council of Edinburgh by one or two of the members, regarding the illuminating power of the gas supplied to the city from the Granton works, the Council last summer ordered that an expert be appointed to report on the whole lighting of the city. The work was entrusted to Mr. Simmance, of London. Mr. Simmance spent over a month in Edinburgh, making observations and tests of an exhaustive kind, both of the gas and the electric lighting. It was stated to a Sub-Committee of the Council yesterday that his report had been received, and it was ordered to be printed for circulation among the members of the Council. It is stated that, as to quality, the reporter finds that both the gas and the electric light supplied are excellent. Variations in the standard of the gas, it is stated, are not due to the manufacture, but to other causes. Owing to the high illuminating power of the Edinburgh gas, it is said to be much more liable to deterioration while being carried over the considerable distance from the works to the consumer. It is also pointed out that in streets where the electric light is used in dwelling-houses, there is a smaller demand for gas, which consequently is allowed to remain longer in the pipes, where the tendency is for it to deteriorate in quality. It is understood that it is recommended that the candle power of the gas should be reduced, and that for street lighting there should be a large extension of the incandescent form of gas-burner. This, of course, is only a preliminary notice of Mr. Simmance's report. It seems, however, to be in entire accord with one made by Mr. W. R. Herring, the Engineer to the Edinburgh and Leith Gas Commissioners, upon the subject of the reduction of the illuminating power of the gas, which was submitted by him to the Commissioners in July last, and was published in the "JOURNAL" at the time (see Vol. XCI., p. 258).

The Hamilton Town Council on Tuesday had before them a business-like report by a Sub-Committee who had considered proposals for the extension of the burgh boundaries so as to include Cadizow, Eddlewood, and Meikle Earnock. The Sub-Committee had had under consideration a statement as to the rentals of the several districts, and they were of opinion that, taking into account the great expense which would be incurred in annexing the districts, and the low valuations, they could not recommend annexation, unless a desire for the extension of the burgh boundaries came from parties outside the burgh. Regarding the extension of the gas-mains to supply the districts with gas, they recommended that the pipes be extended on such terms as might be arranged, if a guarantee were given that gas-fittings should be put into the houses, and a supply of gas taken. This recommendation was adopted.

Last Saturday, by permission of Mr. A. Yuill, the Gas Engineer and Manager, over 100 members of the Dundee Institute of Engineers visited the Corporation Gas-Works. They were shown over the entire works, and took special interest in the carburetted water-gas plant, the working of which was explained to them by Mr. Yuill. The manufacture of sulphate of ammonia was also closely watched. Mr. Yuill was accorded a hearty vote of thanks for his kindness in allowing the visit and receiving the visitors.

The Dumfries Town Council adjusted their Committees last week. There was a good deal of trouble in the operation, the explanation of which was forthcoming when the Gas Committee was reached. There was strong competition to get upon it. After considerable discussion, it was agreed to make the whole Council the Gas Committee, and to hold the meetings of the Committee in the Town Hall, instead of at the gas-works. Provost Glover was appointed Convener of the Committee, with Judge Currie as Sub-Convener.

Mr. G. Kemp, who has filled the office of Convener of the Gas and Electric Lighting Committee of the Aberdeen Town Council for a number of years with much acceptance, has been re-elected to the office; and Bailie William Steel has been elected Convener of the Gas Committee of the Greenock Town Council, in room of Mr. M'Onie, who has held the office for some years.

Last week I referred to the resolution of the Lanark Town Council to appoint an expert to report upon the condition of the works of the Gas Company, which they desire to acquire. I learn that Mr. James M'Gilchrist, of Dumbarton, has been appointed the expert.

The annual meeting of the Turriff Gaslight Company was held on Monday—Provost Hutcheon in the chair. The customary dividend of 5 per cent. was paid—this time on the reconstituted capital of the Company; and, taking into consideration the favourable financial position they are now in, it was resolved to reduce the price of gas from 6s. 8d. to 6s. 3d. per 1000 cubic feet.

I have before me the results of a competition which has been held this year, under the auspices of the Turriff Agricultural Association, for prizes provided by a grant of £10 by the Sulphate of Ammonia Committee for turnip growing. The Association divided the money into four prizes. For these eleven competed. The conditions were that three acres were to be grown, and that not less than 1 cwt. of

"VOLCANIC" (Powder).——————"VOLCUM" (Paste).

Andrew Stephenson,

182, Palmerston House,
Old Broad Street,
LONDON, E.C.

Tel. Address:
"VOLCANISM, LONDON."

LEST YE FORGET.

sulphate was to be used upon each acre. The results in seven instances are given, in comparison with three acres on which no sulphate was used. These results bring out a difference in favour of the sulphate-treated plots of from 5 to 7 tons of turnips. The yields were from 25 to 38 tons with sulphate, and from 20 to 33 tons without; the differences being doubtless due to variations in the soils or exposures.

The Directors of the Cairntable Gas Coal Company recommend a dividend at the rate of 7s. per share, carrying forward £248, after writing off £1318 for depreciation of plant and property, and £117 for depreciations of waggons.

The members of the Scottish Junior Gas Association—Western District—visited the works of the Glenboig Union Fire-Clay Company, Limited, at Glenboig, this afternoon. They were shown the methods of winning the clay, and the processes of the manufacture of gas-retorts and other fire-clay goods for which the Company are celebrated.

Yesterday afternoon, an alarming explosion occurred in a manhole in connection with a new electric lighting system in Airdrie. The cover of the manhole was thrown into the air a distance of about 20 feet. Fortunately no one was injured.

CURRENT SALES OF GAS PRODUCTS.

Week ending Nov. 25.

There is practically no change to report in the London market for tar products. Present prices may be taken to be: Pitch, 35s. 6d. to 36s.; crude carbolic acid 60's, 1s. 9d. to 1s. 9½d.; 90 per cent. benzol, 10½d.; 90-160° solvent naphtha, 1s.; 90 per cent. toluol, 1s.—all net. Sulphate of ammonia has been rather depressed, and some parcels were sold at reduced figures. At the close, however, the tone is somewhat better. The quotation is nominally £12 15s. on Beckton terms for December; but this price would not be accepted for the spring.

Sulphate of Ammonia.

LIVERPOOL, *Nov.* 25.

Although deliveries continue to be on a satisfactory scale, supplies have become more abundant; and although quotations remain £12 7s. 6d. per ton f.o.b. Hull, £12 10s. per ton f.o.b. Liverpool, and £12 12s. 6d. per ton f.o.b. Leith, the tendency of the market is still in favour of buyers. In the forward position, makers for the most part take a sanguine view, and are inclined to look on; but orders continue to be taken abroad speculatively at the equivalent of about £12 12s. 6d. per ton for delivery over the spring months.

Nitrate of Soda.

On spot, the market is quiet at 10s. 10½d. to 11s. 1½d. per cwt., according to quality; while for spring delivery, owing to reduced estimates of November shipments, sellers have assumed a very firm tone.

Tar Products.

LONDON, *Nov.* 25.

There has not been much business doing during the past week, and, as a rule, the market generally is decidedly quiet. In 90 per cent. benzol, further business has been arranged at 10d. per gallon for January-March delivery; in fact, it is reported that a sale was made in the North of England at slightly under this figure for January-June delivery. There is certainly more offering for forward delivery; and it seems possible that prices may be a little easier later on. In 50-90 per cent., the demand is still good; but buyers are certainly not willing to pay the prices asked by manufacturers. There is nothing of importance to advise in toluol. Small sales are reported to have been made at the parity of 11d., and 11½d. per gallon for home consumption. The demand is still very good in solvent for prompt delivery, but supplies are certainly coming forward more rapidly; and a little latter on it is quite probable we may see a slight slackening off in the demand for this article. The high-flash makes are still in very strong demand, especially for early delivery; while sales are reported in 95 per cent. at 160° at high prices for home consumption. In carbolic acid, the demand for crude continues very good indeed, and 1s. 9½d. has been paid in several instances for early delivery; while for January-June makers decline to reduce their quotation, and in most instances ask 1s. 10d. In crystals, there is no business of importance to advise. English makers are now willing to accept 6d. for 39-40 per cent.; but the demand seems to have slackened off, at any rate for the present. The demand for creosote is still very good, especially so far as the London market is concerned, where stocks appear to have been almost entirely cleared out. The American demand for salty oil still continues very good, and large quantities are being shipped. In Yorkshire, small contracts are reported to have been placed at 1⅜d. to 1½d., while in Lancashire manufacturers report a decided improvement for early delivery. The market in pitch is decidedly quiet, and consumers do not appear to take much interest in same at the present time. The principal London makers still ask 35s. to 35s. 6d.; and in some instances 36s.; but neither dealers nor consumers are willing to entertain business at these prices. Yorkshire makes are still in good demand; but consumers are not willing to pay over 35s. for either prompt or forward delivery, and even at this price only a limited quantity could be placed. Distillers in both Manchester and Liverpool advise a strong demand for November-December shipment, and state that some considerable quantity has been placed at fairly good prices. It is rather difficult to understand the position of this market just at the present time, as certainly prices are proportionately dearer in Lancashire than in any other producing quarter. So far as South Wales is concerned, consumers appear to have filled up their requirements, at any rate for the time being; and they are only prepared to consider business for January-June at prices slightly under those now ruling.

The average values during the week were: Tar, 18s. 6d. to 22s. 6d. Pitch, London, 35s. to 35s. 3d.; east coast, 34s. 6d. to 35s.; west coast, 32s. 6d. to 34s. Benzol, 90 per cent., 10d.; 50-90 per cent., 10d. to 10¼d.

THE
MAXIM PATENT CARBURETTOR
FOR ENRICHING GAS IN BULK.
PREVENTS NAPHTHALENE DEPOSITS.
OVER 120 MAXIM PATENT CARBURETTORS HAVE NOW BEEN FIXED.
Among the Companies and Towns supplied are The Gaslight and Coke Company, Manchester, Exeter, Birmingham, Leeds, Rochdale, Bristol, Sheffield, Oldham, Dundee, Perth, Dunfermline, and many other Works, both large and small, where they have been working in some instances for the past **Ten Years.**
MORE GAS & SALEABLE COKE PER TON of COAL CARBONIZED is PRODUCED; SAVING CAPITAL, LABOUR, FUEL, WEAR & TEAR, &c.
THE ENRICHMENT IS INSTANTANEOUS AND PERMANENT.
The Carburettor is inexpensive, easily fixed, and entirely supersedes the use of Cannel.
Dealers in Benzol, Carburine, and all other Naphthas and Oils suitable for the Enrichment or Production of Gas.
For Prices and full Particulars, apply to
THE GAS LIGHTING IMPROVEMENT COMPANY, LIMITED,
18, DEVONSHIRE STREET, BISHOPSGATE, LONDON, E.C.

Toluol, 11d. to 11½d. Crude naphtha, 3⅜d. to 4d.; solvent naphtha, 10½d. to 11d.; heavy naphtha, 11d. to 11½d. Creosote, London, 1 15/16d. to 2d.; North, 1⅜d. to 1½d. Heavy oils, 2¼d to 2⅜d. Carbolic acid, 60 per cent., 1s. 9d. to 1s. 9½d. Refined naphthalene, £4 10s. to £8; salts, 15s. to 17s. Anthracene, "A" quality, 1½d. to 1⅝d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market has been decidedly quiet during the past week, especially as regards prompt, although there is certainly rather more inquiry for forward delivery. Beckton are not anxious to sell for early delivery, but quote £12 17s. 6d. for January-March. The South Metropolitan Company quote £12 16s. 3d. on their own special terms; but buyers decline to pay this price at present. In Hull, business has been done at £12 8s. 9d. for early shipment; while offers of £12 10s. for January-March are reported to have been declined. There is a fairly good inquiry in Liverpool for forward delivery; but as regards prompt £12 10s. may be taken as about the actual value. In Leith, makers ask £12 15s.; but it is reported that some second-hand parcels have changed hands at slightly under this price for early shipment.

COAL TRADE REPORTS.

Lancashire Coal Trade.

Trade in coal of all descriptions keeps steady, and prices, except for engine fuel, continue practically stationary. House coal is meeting with a fairly brisk demand. Furnace coal, too, is selling well. Advanced prices are being secured on new contracts for engine fuel, and more money is being got on renewed contracts. There has been an increased inquiry for cannel during the week. One colliery company near Manchester has received orders for about 3000 tons of this commodity; 500 tons being for the South of England, and the remainder for shipment abroad. Quotations at the pits are: Best house coal 13s. 6d. to 14s. 6d., secondary 12s. to 13s., common 8s. to 10s., steam and forge 8s. to 9s., best engine fuel 7s. 6d. to 8s. 6d., best slack 6s. 6d. to 7s. 6d., medium 6s. to 7s., washed slack 7s. to 7s. 6d., common 5s. to 6s. Coal for shipping on the Manchester Canal is 9s. 6d. to 10s. 6d.; and furnace coke, delivered in Manchester and Salford, 15s. to 20s. per ton.

Northern Coal Trade.

There has been a better demand for certain kinds of coal, and the collieries have been more active generally, though in few cases delays, due to the non-arrival of steamers for cargoes, have taken place. Rather more inquiry has occurred for steam coals—more especially for "smalls," for which there has been a heavy export demand. The prices quoted are: Best Northumbrian steams about 8s. 9d. per ton f.o.b., second-class steams are about 8s. 3d., and smalls are relatively high at 5s. to 5s. 6d. In the Durham coal trade, the chief feature is the increased pressure of the demand for gas coals. The deliveries on the long contracts are now at their fullest height; and except where want of steamers limits the shipments, the quantities sent under these long contracts are very well kept up, so that the work at the collieries is now rather pressing. Durham gas coals vary in price from 8s. 3d. to 9s. 3d. per ton f.o.b., according to quality. Very few contracts are reported this week; and there is more foreign competition to be met with in some of the neutral markets. Other classes of coal only need the statement that heavy contracts for fuel for locomotive use have been fixed for next year at about 6d. per ton advance. Coke is steady; and gas coke is in very full production, so that the prices quoted last week are barely maintained.

Scotch Coal Trade.

Trade continues good. There is a large export business, and the home demand keeps well up. Splint is in such strong request that consumers are finding it difficult to get their full requirements. Ell is very scarce. The prices quoted are—Main 7s. 6d. to 7s. 9d. per ton f.o.b. Glasgow, ell 8s. 6d. to 9s. 3d., and splint 9s. 6d. to 9s. 9d. The shipments for the week amounted to 255,567 tons—an increase of 15,011 tons upon the preceding week, and of 27,749 tons upon the corresponding week of last year. For the year to date, the total shipments have been 10,947,958 tons—an increase of 587,389 tons upon 1904.

New Gasholder and Tank at Prescot.

The Prescot Gas Company last Friday inaugurated a new gasholder and tank. The latter, which is of brick and puddle, is 85 feet in diameter and 22 ft. 6 in. deep, and has been built by Messrs. John Lucas and Sons, a local firm of builders and contractors. The holder is a two-lift, spiral guided. The inner lift is 81 feet in diameter and 22 feet deep; and the outer lift 82 ft. 6 in. in diameter and 22 feet deep. It was erected by Messrs. R. & J. Dempster, Limited, of Manchester. The tank was commenced on the 13th of June last; so that the whole of the work has been executed in rather more than five months. The Chairman of the Company (Mr. Henry Cross) turned on the gas to the holder, and, at a luncheon afterwards, in proposing the toast of "The Contractors," said that, owing to the rapid growth in the demand for gas (notwithstanding very keen competition from the Electric Lighting Company), it had been necessary to augment the storage capacity of the Works, and they had followed the advice of their Engineer (Mr. John E. Hall), in whom they had every confidence, and erected a new gasholder and tank. He and his co-Directors were perfectly satisfied with the excellent manner in which the Contractors had carried out their work, and thought it was a great credit to them. Mr. Knight, representing Messrs. Dempster, and Mr. W. Lucas, representing Messrs. Lucas and Sons, suitably replied.

We
are glad
our

OPPONENTS

do now

ADMIT

they were

NOT

the

ORIGINATORS

of the

GAS-STEAM RADIATOR

Will the Gas Profession please note.

The RICHMOND GAS STOVE & METER Co., Ld.

Works and Offices: WARRINGTON AND STRATFORD, ETC.
London Showrooms and Offices: 132, QUEEN VICTORIA STREET, E.C.

Disposal of Water Surpluses at Carnarvon.

An inquiry has been held at Carnarvon by Mr. F. J. Willis, on behalf of the Local Government Board, into an application by the Corporation for a Provisional Order empowering the Corporation to apply any surplus from the revenue of the water undertaking otherwise than in reduction of the water-rates and charges authorized by the Local Act of 1865. Mr. Rees, who was formerly a member of the Corporation, and for many years Chairman of the Finance Committee, objected to the surplus being devoted to the reduction of the general district rate alone. He claimed that, inasmuch as the Corporation made an allowance of 10 per cent. to owners of large tenements in respect of the water-rent, the owners of small tenements should receive a like rebate in addition to the 30 per cent. allowed for compounding. He also argued that lock-up shops should be treated as domestic premises. The Accountant (Mr. Holden) pointed out that their Act allowed the Corporation to differentiate. He said the total accumulated surpluses from water revenue amounted at present to £2847, whereupon the Inspector remarked that he did not quite see why the water-charges should not be reduced for the benefit of the consumers. The Town Clerk pointed out that the rates, as a whole, were mortgaged; and the Accountant added that there was a scheme in hand for extending the water-mains, at a cost of £4000. Mr. Rees said the Corporation now endeavoured to show that they were keeping the rates down, because they had made bad investments. On the ferry and bridge they were losing £500 a year; and he did not know how much on the baths.

The Lighting of Paignton.—A proposal for the adoption of incandescent lighting in the public thoroughfares was submitted to the Paignton District Council last week. The Gas Company, in a letter referring to the lighting contract, said that the majority of the existing lanterns were worn out, and they could not quote terms for lighting, cleaning, and maintenance. They would, however, fix incandescent burners to all lamps, and undertake the lighting, at £3 5s. per lamp per annum for a term of ten years; the lanterns to become the property of the Council at the end of the time. The matter was referred to the Lighting Committee.

New Issues of Stocks and Shares.—At the Auction Mart, Tokenhouse Yard, on Tuesday, Mr. Alfred Richards placed two new issues by order of Directors. The first consisted of £10,000 of 5 per cent. preference stock and £6000 of 4 per cent. perpetual debenture stock of the South Essex Water Company; and the second of £2000 of "B" stock and £2080 of 4 per cent. perpetual debenture stock of the Horley District Gas Company. The South Essex preference stock fetched £128, and the debenture stock £112 and £112 10s., per £100; while the Horley "B" stock sold at £103 10s. to £104, and the debenture stock at £101 10s., per £100.

Gas for Hathersage.—Definite steps have now been taken in the matter of forming a Company to supply Hathersage, Bamford, and the district with gas. Some days ago a meeting of the inhabitants was held to discuss the idea; and a Committee was formed to carry into effect a resolution recommending that a Company should be formed. Mr. Thomas Brown, the Engineer and Manager of the Matlock Bridge Gas-Works, estimated the total capital required at £10,000, the revenue at £1700, and the expenditure at £1115. He expressed confidence in the scheme, as did also Mr. Robert Hall, a Director of the Matlock and District Gas Company.

Proposed Water-Works Purchase at Herne Bay.—At a special meeting last week, the Herne Bay Urban District Council considered a report of the Finance Committee with regard to a proposal to purchase the undertaking of the local Water Company. The report stated that, as the Company were compelled to seek parliamentary sanction to the raising of £40,000 capital, it was a most opportune time to buy, as the concern could be cheaply acquired. It was estimated that the probable price of the works by arbitration would be £60,000, and that the profits would allow of the yearly repayment of principal and interest. The report further recommended that a Bill be promoted in the ensuing session for the compulsory purchase of the undertaking. The voting on the report was even—seven for and seven against. The Chairman, being a large shareholder in the Company, could not vote. For the time being, at any rate, the proposal is therefore at an end.

Runcorn Water Supply.—An inquiry was held last week by Colonel A. J. Hepper, on behalf of the Local Government Board, into an application of the Runcorn Urban District Council for a Provisional Order to alter and amend the Runcorn Commissioners' Act, 1893, so as to enable them to obtain a supply of water from the Vyrnwy mains of the Liverpool Corporation. Mr. F. A. Lake, the Law Clerk, said the present consumption in the water area was 340,000 gallons per day; and the well which now formed the source of supply had reached its limit. The water, being extremely hard, was most unsuitable for boilers and for manufactures; and some of the largest consumers, in order to save time, had, at their own expense, commenced laying the new main, with the approval of the Council, who wished to take over the connections they had put in. It was stated that the life of a boiler with Runcorn water was only four years; and in some instances canal water was used in preference. There was no opposition.

Leeds Plumbers and the Water Committee.—Some anxiety has been caused among local plumbers by a decision of the Leeds Water Committee to enforce the powers they possess to put a stop to inefficient work. One of the existing regulations provides that "any person may employ a competent plumber to do work in connection with the internal distribution of water; but the Corporation reserve to themselves the right of objecting to the employment of any plumber who may have wilfully infringed these regulations." For the purpose of exercising this right, the Committee have directed that a list of the plumbers in the city shall be compiled, and have decided that the regulation shall be carried out by striking off the list anyone who may have wilfully infringed the regulations for preventing waste and misuse of the water supplied. The seriousness of being "struck off the rolls" in this manner is fully realized; and the prevalent uneasiness arises from the doubt as to the exact degree of ill-doing that will be regarded as justifying this extreme step.

The "MAIN" GAS FIRES, 1905-6.

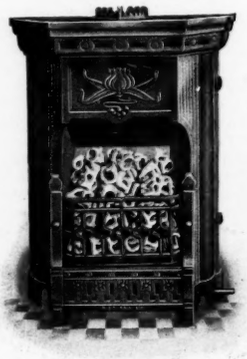
The "Westminster."
Ornamental Design.

Price 45/-.

The "Canterbury"
Ball Fuel Fire.

Price 45/-.

The "Dunkeld"
Nursery Pattern with Boiling Ring on Top.



Price 27/6.

The "Netley."

Prices 24/6 & 30/-.

The "Oxford."

Bright Copper Reflector.

Prices 14/6, 17/6, & 20/-.

The "Durham"
Gas Radiator.

Price 42/6.

LONDON, GLASGOW, FALKIRK.

Gas-Engines for Pumping Water.—The Coventry City Council have resolved that a gas-engine, with the necessary pumps, &c., capable of pumping 600,000 gallons per day, shall be erected, at the estimated cost of £1841, for the purpose of affording an immediate additional supply of water.

Incandescent Gas for School Lighting.—At the meeting of the London County Council last Tuesday, a recommendation by the Education Committee that the lighting of three schools named should be improved by the provision of incandescent gas-burners, at a cost not exceeding £354, was adopted.

Reduced Price for Power Gas at Bilston.—With the view of competing with suction gas, the Directors of the Bilston Gas Company have decided, as from the beginning of the current quarter, to reduce the price of gas used for power purposes to 1s. 6d. net per 1000 cubic feet. This applies only to consumptions of 100,000 cubic feet and upwards per quarter, registered separately from the gas used for lighting. Accounts must be paid on or before the usual pay-day stated therein.

Gas Poisoning Case at Hull.—An inquest was held last Tuesday, at Hull, on the body of Mary Tinegate, a widow, aged 78, who was found in a state of unconsciousness at her home, and subsequently died. A nephew said that, on being informed of the fact that his aunt had not been seen for some time, he went to the house, and found it shut. He effected an entry through the window; and in the bedroom he discovered his aunt in a comatose condition. There was a smell of gas pervading the room; and the jet was partly turned on. The deceased was medically treated, but did not recover. The doctor attributed death to coal-gas poisoning; and a verdict of "Accidental death" was returned.

Gas Explosions.—As a result of a gas explosion which occurred in the upper part of a house at Cooper's Road, Old Kent Road, last Wednesday, one child lost its life and another was removed to the hospital badly burned. The explosion wrecked and set fire to a room; the firemen being summoned to extinguish the flames. On the preceding day, a gas explosion destroyed a portion of the almshouses at Houghton-le-Spring. Two of the inmates were severely burned, one sustaining, in addition, a broken leg. There were no gas-pipes in the house; but one ran behind the demolished room. It is thought that gas escaped from this and accumulated under the floor, as earlier in the night all the lights in the school had gone out.

Leeds Gas-Workers and the Six-Day Week.—On Sunday, the Leeds gas-workers again considered the proposal of the Gas Committee to give them a six-day week (without abolishing Sunday labour), so as to afford work for a larger number of men. Ultimately, the following resolution was unanimously carried: "That this meeting of Leeds gas-workers still adheres to its previous decisions asking for the abolition of Sunday labour instead of it being increased, as suggested, and thus find work for more men and do away with the time-and-a-half now paid. Further, so far as the proposal to refer the matter to conciliation is concerned, we fail to see what good purpose would be served by so doing, more especially seeing the prejudice shown, and the threats made, by the Chairman (Mr. G. Ratcliffe) and other members of the Gas Committee during the recent municipal election."

South Staffordshire Water Company.—The proposal of the South Staffordshire Water-Works Company to carry out a scheme for the better supply of Winshill, a suburb of Burton-upon-Trent, has been agreed to by the Town Council. The arrangement is that the Corporation shall contribute £1000 towards the estimated outlay of £6500 on the water-tower which is to be erected. The wells of the district concerned have been officially condemned; and the inhabitants have therefore been compelled to have recourse to the Company's water. Owing, however, to the elevation of many of the houses, the supply has been very indifferent; but the proposed tower will give an adequate supply to the topmost storey of the highest house in the locality. The discussion on the subject by the Council was a long one; but it was pointed out that the Company were not bound to do more than they had already done, being protected by their Act.

New Water-Works Machinery for Warrington.—The Warrington Corporation have applied to the Local Government Board for sanction to borrow £1000 for the purpose of compounding a beam-engine at their Winwick pumping-station; and at the inquiry some opposition was shown to the proposal, on the ground that the cost should be met out of revenue. The Water Engineer (Mr. J. Deas) explained that the engine in question was put down in 1870; and that the intention of Messrs. Simpson—whose tender had been accepted—was to so place a new high-pressure cylinder as to equalize the strain on the working parts. He had gone very carefully into the matter, and estimated a saving in fuel to the extent of £90 a year. The Borough Treasurer (Mr. Fairhurst) having explained that there was a loss on the water-works last year of £2000, the Inspector asked the reason of the demand that the money should come out of revenue. The reply was furnished by Mr. J. Dodds, who said it would form an object lesson to the ratepayers, who had had a loan debt rushed up to one and a half million pounds during the last few years, through laxity and extravagance.

The Sutton Gas Company and their Sulphate Effluent.—The Sutton (Surrey) Gas Company and the District Council are still discussing the question of the disposal of the sulphate effluent from the gas-works. The Company claim the right to make use of the public sewers for this purpose; but to this the Council object, on the ground that previously when the effluent was allowed to enter the sewers, it killed the bacteria in the sewage beds. Whatever justification there may at one time have been for this contention, the Council or their officials seem to have tripped up badly now. A week or two ago it was reported to the Council that the bacteria beds were not working properly, in consequence of the bacteria being affected by the effluent, and that the discharge of the effluent still continued. Subsequently, the Company forwarded a letter which, for some inscrutable reason, the Council declined to make public; but the Company, wishing the real facts of the matter to be generally known, then sent a copy to the local papers. This letter stated that not a drop of the effluent from the sulphate of ammonia works had been turned into the sewers since April last; it having either been used on the works or stored in a huge tank which had been specially constructed.

PARKINSON'S GAS-FIRES.

NEW DESIGN 1905-6.

The "CORONET."

Choice Design.

Splendid Value.

PARKINSON AND W. & B. COWAN, LTD.

(PARKINSON BRANCH),

COTTAGE LANE, CITY ROAD, LONDON. | BELL BARN ROAD. BIRMINGHAM.

The workmen employed by the Newcastle-on-Tyne and Gateshead Gas Company have during the past year raised a sum of over £260 in aid of the medical charities of the district. The Elswick works contributed £41; the Redheugh works, £104; and the distribution department, £117.

In connection with the recent disastrous gas explosion at Penrith, it has now been officially announced that the Assessors have awarded to Messrs. N. Arnison and Sons, the drapers, whose premises were so seriously damaged, the sum of £2813. The amount claimed from the District Council was £4437.

In continuation of their recent policy the Birmingham Water Committee have arranged to plant a further area of 74½ acres on the watershed in the Elan Valley. The contract has again been let at £4 os. 6d. per acre. The total area now under plantation is about 310 acres; and the portions already planted are doing well.

It is reported that two attempts made at Leicester to provide work for the unemployed have proved dismal failures. In one instance, twelve selected men were given work in pipe-laying. One was dismissed for insolence, and ten others declined to work 12 miles from Leicester. Twenty men on another permanent job acted in a similar manner.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

WORKING MANAGER. No. 4510.
INCANDESCENT BURNER MAINTENANCE. Mitcham and Wimbledon Gas Company.
MAINLAYER. No. 4508.
GAS-FITTER. No. 4509.

Situations Wanted.

ASSISTANT ENGINEER OR MANAGER. No. 4507.
ASSISTANT-MANAGER OR WORKS FOREMAN. Tully, New Southgate.
WORKING FOREMAN OR MAIN AND SERVICE LAYER. Watson, Torquay.

Plant (Second-hand) Wanted.

GAS PLANT (6 millions capacity). Gas and Water Works Supplies and Construction Company.
RETORT MOUTHPIECES. No. 4511.
TOWER SCRUBBER. No. 4503.

Plant (Second-hand) for Sale.

COMPLETE GAS-WORKS PLANT. Turner, Ravensthorpe.
LAMPS AND CAGES. Sutton-in-Ashfield Gas Department.
PURIFIERS, &c. Chertsey Gas Company.

Carbon Wanted. No. 4512.

Stocks and Shares.

COMMERCIAL GAS COMPANY. Dec. 5.
CRAYS GAS COMPANY. Dec. 5.
ROBERTSBRIDGE, SALEHURST, &c., WATER AND GAS COMPANY. Dec. 12.
SOUTHEND WATER-WORKS COMPANY. Dec. 5.

TENDERS FOR

Condensers.

RAMSGATE GAS DEPARTMENT. Tenders by Dec. 9.

Fire-Clay Goods.

LEICESTER GAS DEPARTMENT. Tenders by Dec. 2.
SHEFFIELD GAS COMPANY. Tenders by Dec. 1.

Gas-Works (Complete).

GAS AND WATER SUPPLIES AND CONSTRUCTION COMPANY.

Meters.

CLACTON-ON-SEA GAS DEPARTMENT. Tenders by Dec. 6.

Oil for Gas Making.

GOSPORT GAS COMPANY. Tenders by Dec. 6.

Pipe Laying.

HERTS AND ESSEX WATER COMPANY. Tenders by Dec. 2.

Pipes and Connections.

LEICESTER GAS DEPARTMENT. Tenders by Dec. 2.

Tar and Liquor.

BRIDGEWATER COLLIERIES. Tenders by Dec. 27.
CLACTON-ON-SEA GAS DEPARTMENT. Tenders by Dec. 6.
SHOTLEY BRIDGE AND CONSETT GAS COMPANY. Tenders by Dec. 6.

Washer (Livesey's).

RAMSGATE GAS DEPARTMENT. Tenders by Dec. 9.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."
United Kingdom: One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.
Payable in Advance. If credit is taken, the charge is 25s. a year.

Abroad (in the Postal Union): £1 7s. 6d., payable in Advance.

All Communications, Remittances, &c., to be addressed to
WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

BROTHERTON & CO., LIMITED.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

PATENTS AND TRADE MARKS
PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

"VITERNUS" METALLIC PAINT FOR GAS-WORKS PLANT.
JOHN E. WILLIAMS AND CO.,
LOWER MOSS LANE,
MANCHESTER, S.W.
Telegrams: "ENAMEL." National Telephone 1759.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 54 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 254 Oldham, and 2412 HOP, London.
Telegrams:—
"BRADDOCK, OLDHAM," and "METRIQUE, LONDON."

DUTCH OXIDE OF IRON.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

THE First Dutch Bogore Co., Ltd.,
HOLLAND.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON.
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 Years. References given to Gas Companies.

AMMONIACAL Liquor wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers.
Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

SPENT OXIDE.
THE South Metropolitan Gas Company are always open to receive OFFERS of SPENT OXIDE.
Chief Office: 709, Old Kent Road, London, S.E.
Telegrams: "METROGAS, LONDON."

OXIDE OF IRON.
(NATURAL.)
BALE & CHURCH will be pleased to send Quotations and Samples on application.
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT for all Retort and Furnace work.
PAINT for Gasholders, Purifiers, &c.
5, CROOKED LANE, LONDON, E.C.

SULPHURIC ACID.

SPECIALLY prepared for the Manufacture of SULPHATE OF AMMONIA.
SPENCER, CHAPMAN, & MESSEL, LTD.
(with which is amalgamated WM. PEARCE & SONS, LTD.,
36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341, AVENUE.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers.
Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

GAZINE—A radical Solvent and Preventative of Naphthalene deposits, which has been used for many years on the Continent for the cleaning of Mains and Services, and is now being adopted in England. It is also used for the Enrichment of Gas, and has an Illuminating Value of double that of 90 per cent. Benzol.
Supplied by C. BOURNE, 120, Manor House Road, NEWCASTLE-ON-TYNE.

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO, LTD., Chemical Manufacturers
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

TAR AND LIQUOR WANTED.
Best Prices paid.
DENT AND CO.,
Ouse Chemical Works, SELBY.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

GLASS SHADES of every description, for all kinds of Interior **GAS LIGHTING.** Illustrated sheets on application.
JOHN WALSH WALSH,
SOHO AND VESTA GLASS WORKS, BIRMINGHAM.
Telegrams: "VESTA, BIRMINGHAM."
National Telephone: No. 63.
London Show-Room: 4, HOLBORN CIRCUS, E.C.

TO WATER AND GAS COMPANIES REQUIRING CAPITAL.

THE Water and Gas Debenture Share Investment Trust, Limited, of 37, High Street, Tunbridge Wells, are prepared to Invest £10,000 Capital in above, and also to Underwrite Progressive Water and Gas Companies' issues.

WANTED, Re-engagement as Working FOREMAN or MAIN and SERVICE LAYER. Practical Gasfitter, Sulphate Maker, &c. Abstainer. Excellent Testimonials and References.
Address, G. WATSON, 7, Orchard Cottages, Hele, TORQUAY.

SITUATION wanted as Assistant- ENGINEER or MANAGER of Medium Sized Gas-Works. Thorough training in large modern Works. Good Chemist and Draughtsman. Eight Years practical Experience in Gas-Works Management and Routine, and Erection and Starting of New Plant, &c.
Address No. 4507, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

SITUATION Wanted as Assistant MANAGER or WORKS FOREMAN. Age 24. Experienced in Adjusting and Working Regenerative Settings, Slopers, Horizontals, and Machine Stokers, Water-Gas Installations, Sulphate and Ammonia Concentrating Plants, and General Gas-Works Construction. Good Chemist and Draughtsman.
Address, S. J. B. TULLY, 2, Pembroke Road, NEW SOUTHGATE.

WANTED, an experienced Main-Layer, accustomed to large and small Mains and to the Control of Men. Must be steady and reliable.
Apply, giving Particulars of Experience, References, Age, and Wages required, to No. 4508, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED immediately, a Working MANAGER for a Small Works (under 4 Millions) in Glamorganshire. Must be a good Gas-Fitter, iron and compo.
Applications, stating Age, Experience, and Salary, with *Copies* of recent Testimonials; to No. 4510, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an Experienced and Reliable GAS-FITTER, well acquainted with House Fittings and a competent Meter Reader, in a country town. Must write a good hand, and be able to correctly keep ordinary and slot meter reading books.
Apply, stating Age, Wages required, with References, to No. 4509, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MAINTENANCE of Incandescent Burners.—Wanted, a competent Man.
Apply, stating previous Experience, Age, and Wages required, to BENJAMIN GREEN, Secretary and Manager, Mitcham and Wimbledon Gas Company, Gas-Works, MITCHAM.

WANTED to Purchase, Gas Carbon delivered at nearest Station to Gas-Works, in quantities of not less than Four Tons.
State Price to No. 4512, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a good Second-Hand Tower- SCRUBBER, suitable for Works Carbonizing 3000 to 4000 Tons per annum.
Send Price and Particulars, to No. 4503, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Second-Hand Cast-Iron RETORT MOUTHPIECES, self-sealing preferred, of ∩ section, and 18 in. by 14 in. or 18 in. by 15 in. internal measurements, in Sets of Eights, with Sockets for 6-inch Ascension Pipes. Must be in good condition and cheap.
Full Particulars and Prices to No. 4511, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED to Purchase, any good Second-Hand GAS PLANT and CONNECTIONS for Gas-Works of about 6 Million cubic feet. It is essential that it should be in excellent condition.
TENDERS are likewise required for the supply and erection of a COMPLETE GAS-WORKS, capable of turning out 6 Million feet per annum.
Full Particulars to the GAS AND WATER WORKS SUPPLIES AND CONSTRUCTION COMPANY, LIMITED, 99, Cannon Street, LONDON, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE—Four Purifiers, 10 feet square, with 6-Cockey's Valves, Lifting Apparatus, and 8-inch Connections, complete.
Apply to the MANAGER, Gas-Works, CHERTSEY.

FOR SALE — Works, Plant, and Undertaking of the Thurso Gas Company, at Thurso, N.B.
Apply to J. W. TURNER, Gas Engineer, Ravensthorpe, YORKS.

THE Sutton-in-Ashfield Urban District Council invite TENDERS for all or any portion of 220 COPPER STREET LAMPS and CAGES.
Full Particulars may be obtained from Mr. THOMAS ROBINSON, Gas-Works Manager.

CLACTON URBAN DISTRICT COUNCIL.

GAS-METERS.

THE above Council are prepared to receive TENDERS for the supply of Prepayment and Ordinary Dry GAS-METERS.
Full Particulars may be obtained upon application to Mr. Sydney Francis, A.M.Inst.M.E., the Council's Engineer, Town Hall, Clacton-on-Sea.
Tenders, sealed, and endorsed "Tenders for Meters," to be delivered to the undersigned not later than Twelve o'clock noon on Wednesday, the 6th of December next.
The Council do not bind themselves to accept the lowest or any Tender.

GEO. T. LEWIS,
Clerk to the Council.

Town Hall Buildings,
Clacton-on-Sea.

CLACTON URBAN DISTRICT COUNCIL.

TAR.

THE above Council are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Gas-Works for the ensuing Twelve Months.
Particulars may be obtained from Mr. Sydney Francis, A.M.Inst.M.E., the Council's Engineer, Town Hall, Clacton-on-Sea.
Sealed Tenders, endorsed "Tender for Tar," to be delivered to the undersigned not later than Twelve o'clock noon on Wednesday, the 6th of December next.
The Council do not bind themselves to accept the highest or any Tender.

GEO. T. LEWIS,
Clerk to the Council.

Town Hall Buildings,
Clacton-on-Sea.

CORPORATION OF LEICESTER.

RETORTS AND FIRE-BRICKS.

THE Gas and Electric Lighting Com- mittee of the above Corporation are prepared to receive TENDERS for the supply and delivery of RETORTS and FIRE-BRICKS required during the Year 1906.
Specifications, Quantities, and Form of Tender can be obtained upon application to the Engineer.
Tenders, addressed to Mr. Councillor Edwards, Chairman, and endorsed "Tender for Retorts, &c.," to be delivered at these Offices not later than Eleven o'clock a.m. on Saturday, Dec. 2, 1905.
The Committee do not bind themselves to accept the lowest or any Tender.

ALFRED COLSON, M.Inst.C.E.,
Engineer and Manager.

Offices: Millstone Lane,
Leicester, Nov. 15, 1905.

CORPORATION OF LEICESTER.

CAST-IRON PIPES.

THE Gas and Electric Lighting Com- mittee of the above Corporation are prepared to receive TENDERS for the supply and delivery of the necessary CAST-IRON PIPES AND CONNECTIONS, from 2 inches to 36 inches in diameter, required during the Twelve Months ending Dec. 31, 1906.
Specification and Form of Tender may be obtained upon application to the Engineer.
Tenders, addressed to Mr. Councillor Edwards, Chairman, and endorsed "Tender for Cast-Iron Pipes, &c.," to be delivered at these Offices not later than Eleven o'clock a.m. on Saturday, Dec. 2, 1905.
The Committee do not bind themselves to accept the lowest or any Tender.

ALFRED COLSON, M.Inst.C.E.,
Engineer and Manager.

Offices: Millstone Lane,
Leicester, Nov. 17, 1905.

HERTS AND ESSEX WATER-WORKS COMPANY, LIMITED.

TO PIPE-LAYING CONTRACTORS.

CONTRACT No. 2.

THE Directors of the Herts and Essex Water-Works Company, Limited, are prepared to receive TENDERS for the LAYING of about 720 yards of 12-inch, and 2000 yards of 9-inch internal diameter Cast-Iron Socket Pipes.
The Specification and Plan may be inspected, and Forms of Tender may be had on payment of the sum of Two Guineas, to be returned on receipt of a *bond-fide* Tender, on application at the Office of Messrs. T. & C. Hawksley, Civil Engineers, 30, Great George Street, Westminster, S.W., on or after Saturday, the 18th day of November; and Tenders must be delivered at the Office of the Company, 28, Victoria Street, Westminster, addressed to the Secretary, at or before Ten o'clock in the morning of Saturday, the 2nd day of December, 1905.
The Company do not bind themselves to accept the lowest or any Tender.

WILLIAM JONES,
Secretary.

28, Victoria Street,
Westminster, S.W.

FIRE-CLAY GOODS.

THE Directors of the Sheffield United Gaslight Company invite TENDERS for the supply of SILICA and FIRE-CLAY GOODS required at their Neepsend, Effingham Street, and Grimesthorpe Stations during the next Twelve Months.
Specifications and Forms of Tender may be obtained upon application to the Company's Engineer, Mr. J. W. Morrison.
The Directors do not bind themselves to accept the lowest or any Tender.
Sealed Tenders, marked "Tender for Fire-Clay Goods," must be delivered by post to the undersigned not later than the first post on Friday, Dec. 1, 1905.

HANBURY THOMAS,
General Manager and Secretary.

Commercial Street,
Sheffield, Nov. 10, 1905.

BRIDGEWATER COLLIERIES COKE-WORKS.
(THE EARL OF ELLESMERE.)

TENDERS are invited for the Tar pro- duced at the above Works for a period of Six or Twelve Months from the 1st of January, 1906, delivered into Contractor's Tanks at the Bridgewater Colliery Siding, Wharton Hall, on the Pendleton and Hindley Branch of the Lancashire and Yorkshire Railway; or at the Brackley Siding, Little Hulton Mineral Branch of the London and North-Western Railway.
The estimated quantity is about 2500 Tons per annum.
Tenders, endorsed "Tender for Tar," to be addressed to Mr. Thomas M. Brown, Bridgewater Coal Offices, 4, Chapel Walks, Manchester, not later than the 27th of December.
Manchester, Nov. 28, 1905.

GOSPORT GAS AND COKE COMPANY.

GAS OIL.

THE Directors invite Tenders for their requirements of GAS OIL suitable for the Manufacture of Carburetted Water Gas, for the Year 1906.
Full Particulars and Form of Tender can be obtained on application to the Engineer, Mr. W. H. Adams, Gas-Works, Gosport.
Tenders, endorsed "Gas Oil," to be delivered to the undersigned not later than the 6th prox.
The lowest or any Tender not necessarily accepted.

ALFRED LOACH,
Secretary.

Gas Offices, 142, High Street,
Gosport, Nov. 14, 1905.

RAMSGATE CORPORATION.
(GAS DEPARTMENT.)

TENDERS FOR CONDENSERS AND LIVESEY WASHER.

THE Gas and Water Committee invite TENDERS for the Supply, Delivery, and Erection at their Gas-Works, of a set of VERTICAL WATER-TUBE CONDENSERS and a LIVESEY WASHER.
Specifications and Forms of Tender may be had on application to the undersigned.
Separate Tenders, sealed and endorsed "Condensers" or "Washer," to be addressed to the Chairman of the Gas and Water Committee, Gas and Water Offices, Boundary Road, Ramsgate, and delivered on or before Saturday, Dec. 9, 1905.
The Committee do not bind themselves to accept the lowest or any Tender.

T. N. RITSON, Assoc.M.Inst.C.E.,
Engineer and Manager.

Gas and Water Offices, Boundary Road,
Ramsgate, Nov. 24, 1905.

THE ROBERTSBRIDGE, SALEHURST, AND HURST GREEN WATER AND GAS COMPANY, LIMITED.

SALE BY TENDER
OF
£1670 Five per cent. Debentures,
£4740 Six per cent. Preference,
£1910 Ordinary Shares.

THE DEBENTURES ARE REDEEMABLE IN SEVEN YEARS FROM ALLOTMENT AT £10 PER CENT. PREMIUM.

MINIMUM PRICE (Par):
£5 per Share, £10 per Debenture.

THE DIRECTORS of the above Water and Gas Company hereby give notice that, in accordance with the Resolution passed by the Board on the 22nd of May, 1905, and Resolution of Shareholders, June 20th, 1905, they will be prepared to receive on or before noon of the 12th of December, 1905, sealed Tenders for the purchase of the above Stock and Shares of and in the above Company.
Forms of Tenders can be obtained on application to Lloyds Bank, Limited, Lombard Street, E.C., and Tunbridge Wells, and the Company's Office, 37, High Street, Tunbridge Wells.

By Order of the Board,
A. W. LUNT,
Managing Director.

Nov. 25, 1905.

"*Invaluable to those engaged in lighting works.*"—ENGINEERING. NOW READY, Price 10/6 net. REVISED TO JULY, 1905.

TWENTY-EIGHTH ANNUAL ISSUE.

GAS-WORKS DIRECTORY AND STATISTICS 1905-6

WITH ALPHABETICAL LIST OF CHAIRMEN, MANAGERS, ENGINEERS, AND SECRETARIES.

SEND FOR PROSPECTUS AND SPECIMEN PAGES,

LONDON: HAZELL, WATSON, & VINEY, LTD., 52, LONG ACRE, W.C.

SHOTLEY BRIDGE AND CONSETT DISTRICT GAS COMPANY.

TENDERS FOR TAR.

THE Directors of this Company invite TENDERS for the purchase of the TAR to be produced at their Works during the Year 1906. Quantity, about 70,000 Gallons.

The Contractor to find his own Casks and to accept delivery at Blackhill Station.

Tenders to be sent not later than Wednesday, Dec. 6.

M. RICHLEY,
Secretary.

Shotley Bridge, Nov. 18, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
COMMERCIAL GAS COMPANY.

NEW ISSUE OF £25,000 THREE PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Dec. 5, at Two o'clock, in Lots.

Particulars of the SECRETARY of the COMPANY, at the Offices, Ben Jonson Road, STEPNEY, E.; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTHEND WATER-WORKS COMPANY.

NEW ISSUE OF £11,500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Dec. 5, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
CRAYS GAS COMPANY.

NEW ISSUE OF £5000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Dec. 5, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

GILBERT LITTLE & CO., LTD.

Conveyor and Elevator Specialists,
Smethwick, Birmingham.

Make known your wants for Conveyors and Elevators to GILBERT LITTLE, the Pioneer Specialist; he will supply them.

THOMAS DUXBURY & CO.,
16, DEANSGATE, MANCHESTER,
Gas Engineers' Agents and Contractors for METERS, FIRE-CLAY GOODS, OXIDE OF IRON, AND ALL OTHER GAS APPARATUS.
Inquiries Solicited.
Telegrams: "DARWINIAN, MANCHESTER."
Telephone 1806.

PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. EDWARD PRICE, "Langley," Wyke Avenue, WORTHING.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,
LIMITED,
NEWBATTLE COLLIERIES,
DALKEITH, N.B.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and yield of Gas.

Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.,
CHESTERFIELD.

GAS LAMPS,
REFLECTING LANTERNS, &c.

S. SHERMAN & SON,
WEST CENTRAL GAS LANTERN WORKS

HEAD OFFICE:
57, NEW COMPTON ST., W.C.

CATALOGUE (Just Printed) ON APPLICATION.

Telephone: 4939 Gerrard.
Telegrams: "Illuminate, London."

THE
"ROTARY" STATION METER.

Efficiency Demonstrated.

APPLY—
T. G. MARSH,
MAWSON CHAMBERS, DEANSGATE,
MANCHESTER.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE LIMITED,
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: H. CRESSWELL & CO., LEADENHALL CHAMBERS, 4, ST. MARY AXE, E.C.

MIRFIELD GAS COAL
UNEQUALLED.
Sperm Value 878·85 lbs. per Ton.

Please apply for Prices, Analyses, and Reports, to the

MIRFIELD (GAS COAL) COLLIERIES
RAVENSTHORPE, NEAR DEWSBURY.
LONDON: 22, Park Village East, N.W.

JAMES OAKES & CO.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.

Manufacture and keep in Stock at their Works (also large Stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with Bolts, Nuts, and Covers, and rendering Leakage impossible.

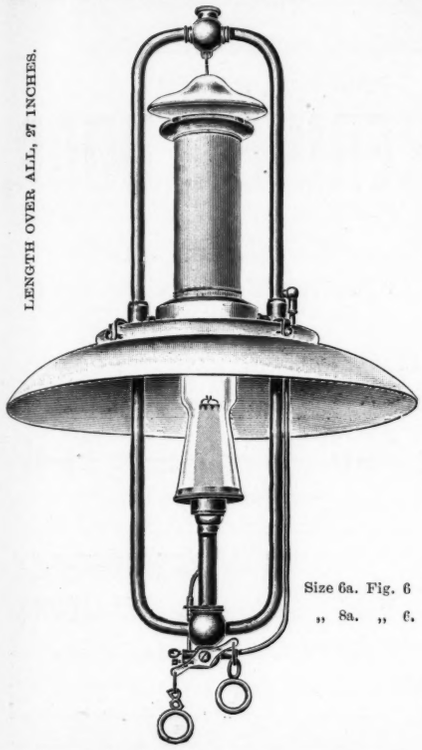
THOMAS TURTON AND SONS, LIMITED
SHEAF WORKS, SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES,
SPANNERS, RATCHET BRACES, LIFTING JACKS
ANVILS, VICES,
AND ENGINEERS' TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

GEORGE WILSON, COVENTRY,
Wet and Dry Gas Meter Manufacturer.
PREPAYMENT METERS for Pennies, Shillings, or any other Coin.

A. E. PODMORE & CO.,

PATENT HIGH-POWER LAMP

(ORDINARY PRESSURE)



Size 6a. Fig. 6
„ 8a. „ 6.

OUR

BURNERS

ARE ABSOLUTELY

DUST AND INSECT PROOF,

SUITABLE FOR RETORT-HOUSES, LAUNDRY WORK, FOUNDRIES, FLOUR MILLS, AND BUSINESS PREMISES GENERALLY, &c.

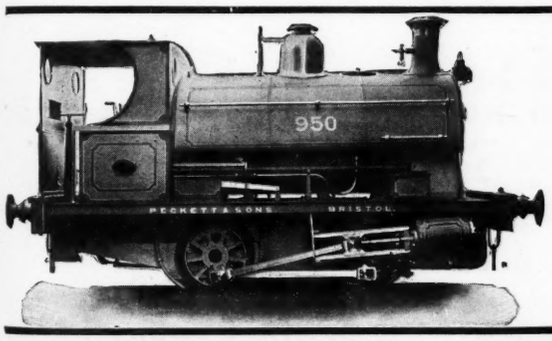
A. E. P. & Co., after extensive trials of their Patent Interior Lamps in various parts of the country, are prepared to **guarantee and renew** any **wearing part** of this Lamp—Fair wear and tear allowed—within twelve months of the date of purchase,

GLASS AND MANTLES EXCEPTED.

WRITE FOR OUR COMPLETE LISTS.

33, CHARLES ST., HATTON GARDEN, E.C.

Telephone 6600 CENTRAL. A.B.C. Code 5th Edition used. Telegrams: "PROMEROPE, LONDON."



LOCOMOTIVES

LOCOMOTIVES of all Sizes and Gauges specially constructed for Main and Branch Lines, Contractors, Docks, Gas-Works, Collieries, Iron-Works, Brick and Cement Works, &c. Locomotives of various Sizes always in Stock, ready for immediate delivery.

Photographs, Specifications, and Prices on Application.

PECKETT & SONS, Atlas Locomotive Works, **BRISTOL.**

Telegraphic Address: "PECKETT, BRISTOL."

REDUCED MAINTENANCE.

A BOLD ASSERTION, to all whom it may concern.

We, **the G.I.C.,** undertake to effect a considerable saving in the cost of maintenance of Public and Private Lighting Installations, by supplying **MANTLES** of finest Ramie (in 15 sizes) from No. 2 Kern to 700-Candle Lucas. **Quality Guaranteed.**

Also **GLOBES, BULBS, CHIMNEYS,** and **PROTECTION GLASSES** of the finest Rock Crystal. **Guaranteed.**

BURNERS of all kinds, Novelties in Intensive and Inverted Lamps, and everything of the latest and best for Incandescent Lighting.

PRICES. We cordially invite inquiries for quotations and estimates, and finally guarantee to supply at cheaper rates than any other reputable House in the Trade.

Kindly write us for Prices and Compare.

THE GENERAL INCANDESCENT COMPANY, LTD.

(LONDON, BERLIN, NOTTINGHAM, and DERBY),

52, GREAT EASTERN STREET, LONDON, E.C.

GASHOLDER TANKS. BUILDINGS.

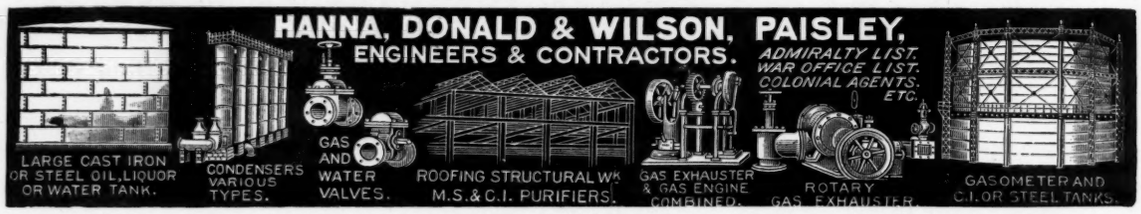
THOMAS VALE & SONS, LTD.,
Contractors, **STOURPORT.**
CARBONIZING WORKS.
KLONNE SETTINGS A SPECIALITY. High-Class Work Only.

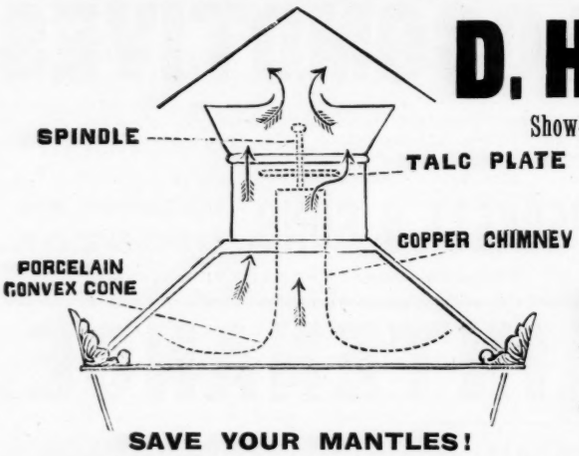
ARROL-FOULIS
Patent Automatic Machinery
FOR
DRAWING AND CHARGING GAS-RETORTS.

Full Particulars may be obtained from the Sole Makers,
SIR WILLIAM ARROL & CO., Limited,
GLASGOW.
[See Illustrated Advertisement, Nov. 7. p. 354.]

Price 10s. 6d. Green Cloth, Gilt Lettered.
VOL. XCI.
OF THE
JOURNAL OF GAS LIGHTING,
WATER SUPPLY, &c.
LONDON: WALTER KING, 11, Bolt Court, Fleet Street, E.C.

TIMMIS'S PATENT
CLINKERING DOOR.
For Illustrated Advertisement, with full Particulars, see "JOURNAL" for April 4, p. 66.
GEO. H. TIMMIS,
River Stour Works, STOURBRIDGE.
Telegrams: "TIMMIS, LYE." National Telephone: 13, LYE.
or of **HARPER & MOORES, LTD.,**
STOURBRIDGE.


HANNA, DONALD & WILSON, PAISLEY,
ENGINEERS & CONTRACTORS.
ADMIRALTY LIST.
WAR OFFICE LIST.
COLONIAL AGENTS.
ETC.
LARGE CAST IRON OR STEEL OIL, LIQUOR OR WATER TANK.
CONDENSERS VARIOUS TYPES.
GAS AND WATER VALVES.
ROOFING STRUCTURAL WK M.S.& C.I. PURIFIERS.
GAS EXHAUSTER & GAS ENGINE COMBINED.
ROTARY GAS EXHAUSTER.
GASOMETER AND C.I. OR STEEL TANKS.



SAVE YOUR MANTLES!

D. HULETT & CO., LD.
Show-Rooms and Offices: 55 & 56, HIGH HOLBORN, LONDON.
Lamp and Meter Works: Harpur Mews, Theobald's Road, LONDON.
SOLE MANUFACTURERS OF
"BENNETT'S"
Patent STORM PROOF STREET LAMP.
MAKERS OF
OUTSIDE LAMPS of every description; also METERS, SERVICE CLEANSERS, and GAS FITTINGS.

IMPORTANT NOTICE.

It is the practice of the "Gas World" to publish from time to time analyses of the accounts of Gas Undertakings in this Country. A number of such analyses appeared in the issue for September 16, and they show that at Fenton, Longton, Rotherham, and Tipton, some of the highest results were obtained in Gas Made and Coke Sold.

It may be interesting to Gas Engineers to learn that at these four places Winstanley's Settings are in use.

The Winstanley Speciality Company, Newton Chambers, Cannon Street, Birmingham.

It will pay YOU to handle the Block Light.

THERE IS QUICK PROFIT FOR YOU IN THE BLOCK LIGHT.

THE Block Light sells quickly because it is the brightest and best home light in the world, and because of our strong attractive advertising.

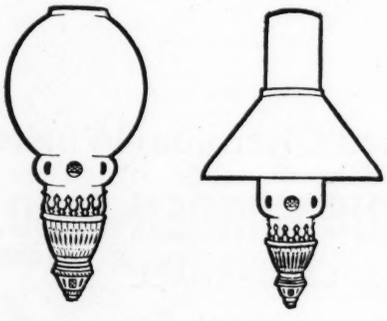
Full page advertisements in leading daily newspapers and magazines throughout the country, supported by smaller advertisements, have made the Block Light known all over the United Kingdom. Your own customers and others who you would like to have as customers want the Block Light. Do not let them go elsewhere to obtain it. The Block Light pays 33⅓ per cent. profit to you. Send your order to any factor.

Block Lights not only sell quickly, but give satisfaction to your customers. You will find that if you sell a family one Block Light, in a little while every light in their house will be a Block Light. It is essentially an article that brings repeat orders, and that is the kind of article every dealer is looking for.

We not only create a market for you through our advertising, but we send you new customers daily.

WHY THE BLOCK LIGHT GIVES SATISFACTION.

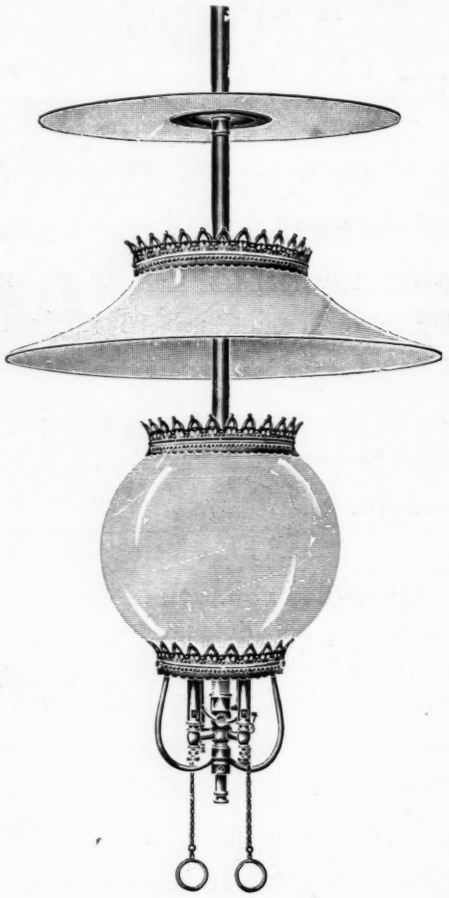
One Block Light gives a light which is equal to that given by four incandescent burners of the ordinary kind. Each of these four burners would consume 4 feet of gas per hour, or 16 feet in all, while one Block Light burner with a single mantle will consume 6 feet of gas. The Block Light thus saves the cost of 10 feet of gas per hour, and gives a better light. Every time the gas bill is sent to a home that has changed from ordinary lights to Block Lights, it reminds your customer of the saving effected.



THE
Block Light Co. of England,
Saracen Chambers, Snow Hill,
LONDON, E.C.

THE **Lunar** An Ideal Lamp for Lighting Shop Interiors

500-CANDLE POWER.



G.7109.

COMPACT APPEARANCE.

TAKES ORDINARY "C" MANTLES.

EASY TO MANIPULATE.

Descriptive List post free on application.

FALK, STADELMANN, & Co., LIMITED,
83, 85, & 87, Farringdon Road,
AND AT **LONDON, E.C.**
74, 76, & 78, Gt. Clyde Street, GLASGOW.

BOWENS' Ltd. Successors,
STOURBRIDGE.
MANUFACTURERS OF
BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.
ESTABLISHED 1860.

GAS COAL AND CANNEL.

WILSON CARTER & PEARSON, LIMITED.
Gas, Steam, and other Fuel for Home and Export.
GAS COKE CONTRACTORS.
CHIEF OFFICES:
50, NEW STREET, BIRMINGHAM.

THE THAMES BANK IRON CO.
UPPER GROUND STREET, LONDON, S.E.
SUPPLY FROM STOCK
CAST-IRON RETORTS
AND ALL KINDS OF GAS-WORKS APPARATUS.
SOCKET-PIPES FOR GAS OR WATER PURPOSES.
FLANGE PIPES FOR STEAM.
Sole Manufacturers of LYON'S "PATENT" GAS-MAIN SYPHONS.
AGENTS FOR
ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.

STRONCO. INO. STRONCO. INO. STRONCO. INO.

GAS METERS.
SLOT METERS.
GEYSERS.
COOKERS.
STOVES.
WORKSHOP LAMPS.
GAS IRONS.
IND. GAS APPLIANCES.
FITTINGS.

CENTRAL WORKS in DESSAU
OF THE
GERMAN CONTINENTAL GAS ASSOCIATION
(Deutsche Continental Gas Gesellschaft).
For Illustrated Price Lists and full Particulars apply to our SOLE AGENTS FOR THE UNITED KINGDOM AND COLONIES:
THE INCANDESCENT LIGHTING & MANTLE INSURANCE CO.,
57/58, CHANCERY LANE, LONDON, W.C.
Telephone: 12788 CENTRAL. Telegrams: "FRAENKL, 58, CHANCERY LANE."

Wrought-Iron
TUBES
And Fittings & Accessories.

LAMBERT BROS., WALSALL,
MANUFACTURERS OF
WROUGHT-IRON TUBES & FITTINGS for GAS, WATER, & STEAM.
BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES, TOOLS, &c., AND OF WARNER'S PATENT MARKET GAS STAND-PIPE.
LONDON: LAMBETH BRASS & IRON CO., LTD., 91 & 93, SOUTHWARK ST., S.E.

JOHN BROWN & CO., LTD., SHEFFIELD,
Proprietors of
ALDWARKE MAIN, CAR HOUSE, & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.
ALDWARKE MAIN GAS COAL
Analysis: 12,600 Feet of 19-Candle Gas per Ton.
Value in Pounds of Sperm, 820·20.
VERY FREE FROM IMPURITIES.
TELEGRAMS: "ATLAS, SHEFFIELD."

SAML. CUTLER & SONS,
MILLWALL, LONDON.
GASHOLDERS.
STEEL TANKS.
CONDENSERS.
ROOFS.
JÄGER GRIDS
CAPACITY OF PURIFIERS DOUBLED.
PRESSURE CONSIDERABLY REDUCED.
Special Circular describing the Jäger System of Purification on application.
CARBURETTED WATER GAS
Maximum Efficiency Guaranteed.
A LARGE NUMBER OF PLANTS IN OPERATION.
Every Requirement for Gas-Works.
(105.)

11 **Modern Maxims** 11

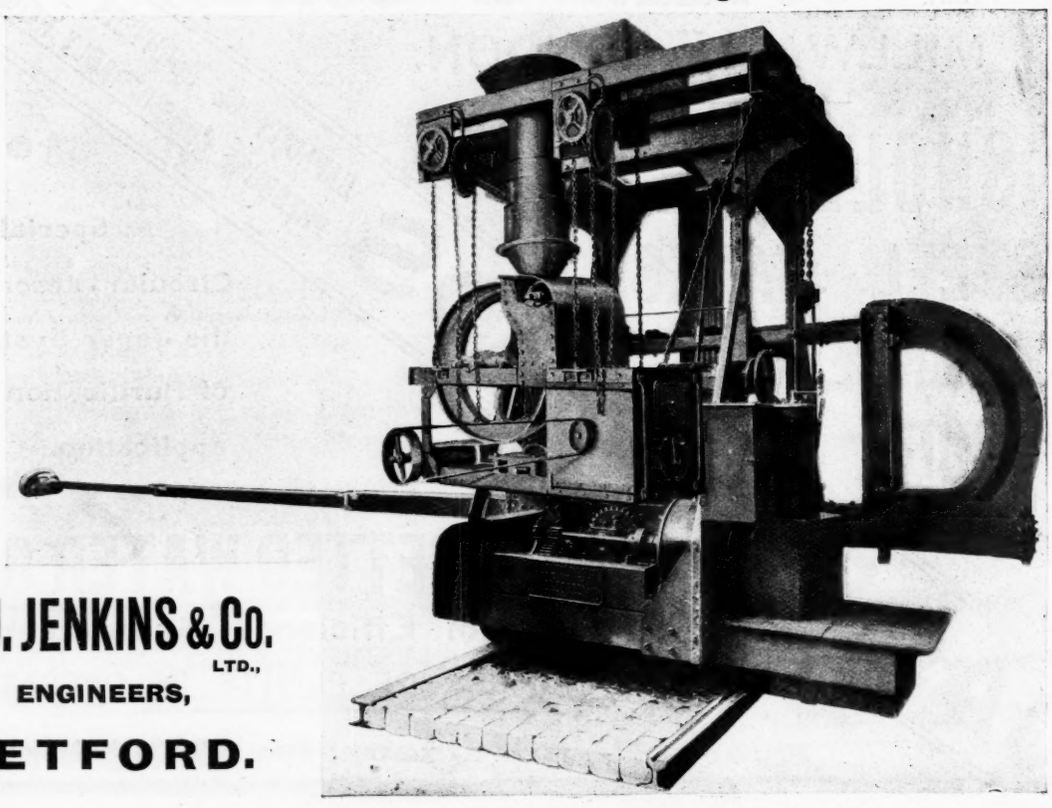
"To know the 'K' is to cry quits to Misfortune"

You may have had disappointments with Inverted Burners—you get even with Misfortune, when you take to patronizing "K" Burners. It is a genuinely scientific Burner—only a little metal, but a great light. It is the one Burner that you can rely upon to give no trouble.

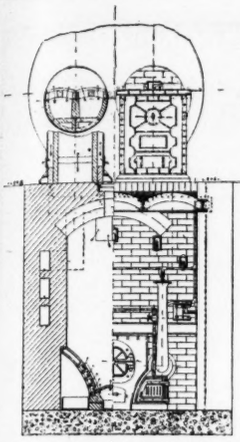
MOFFAT'S LTD., 155, FARRINGDON ROAD, LONDON, E.C.

THE COMPLETE STOKER.

Both Discharging and Charging Operations performed by one machine, for Retorts 20 feet through.



W. J. JENKINS & Co. LTD.,
ENGINEERS,
RETFORD.



HISLOP'S
PATENT SYSTEM OF BOILER FIRING.

20 % Saving in Fuel.
20 % more Water Evaporated per hour.
Steady Steam Pressure.
Fuel Employed—Coal or Coke.

Perfect Combustion—17 to 18 % CO_2 in Waste Gases.
Producer Cleaned once in 24 to 48 hours.
Applicable to all Boilers.

INEXPENSIVE. DURABLE. SIMPLE.

DESIGNS AND ESTIMATES FROM

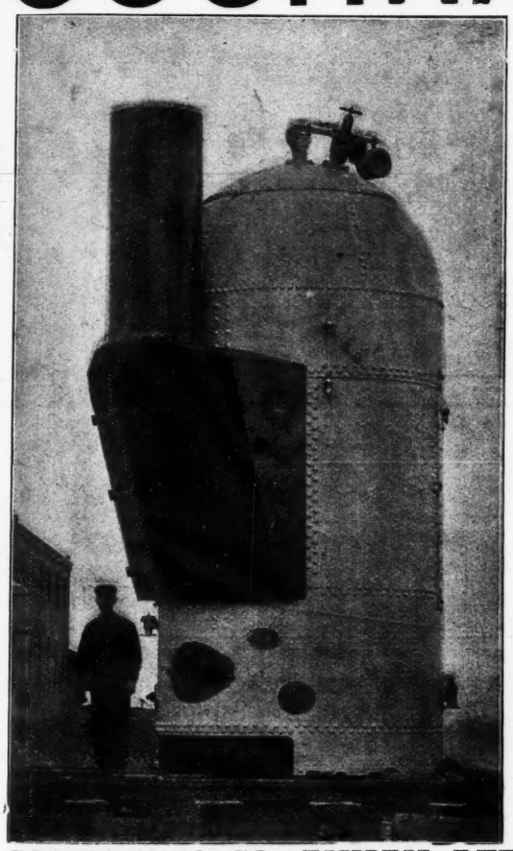
R. & G. HISLOP, 13, ST. JAMES PLACE, PAISLEY.

LONDON—87, VICTORIA STREET, S.W.

COCHRAN

PATENT VERTICAL
MULTITUBULAR

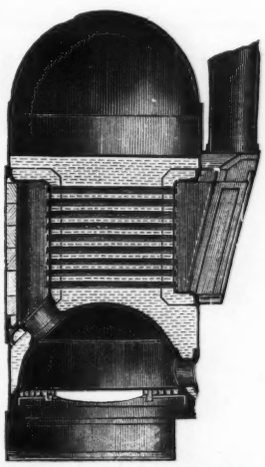
BOILERS.



WRITE FOR LIST A 3

SINGLE BOILERS
FROM
10 TO 150
I. H. P.

BATTERIES
UP TO
ANY POWER.



London Office: **SANCTUARY HOUSE, TOTHILL STREET, WESTMINSTER.**
Telegrams: "MULTITUBE, LONDON."
Telephone: 650 VICTORIA.

COCHRAN & CO., ANNAN, LTD., ANNAN, SCOTLAND. Telegrams: "MULTITUBE, ANNAN.

COAL TAR PRODUCTS.

Benzol, Toluol, Solvent Naphtha, Creosote Oils, Grease Oils, Carbolic Acid, Crude Creosote Salts, Granulated (Crude) Naphthalene, Sublimed Naphthalene, Anthracene, Refined Tar, Pitch, also Sulphate of Ammonia.

For Prices apply to the **SOUTH METROPOLITAN GAS COMPANY,**

Works: ORDNANCE WHARF, EAST GREENWICH, LONDON, S.E.

709, OLD KENT ROAD, LONDON, S.E.

Telegraphic Address: "METROGAS, LONDON."

EVERED & CO., LTD.,

27 TO 35, DRURY LANE, LONDON.
SURREY WORKS, SMETHWICK.
BARNET WORKS, BIRMINGHAM.

Brass Gas-Fittings Manufactory—SURREY WORKS, SMETHWICK.

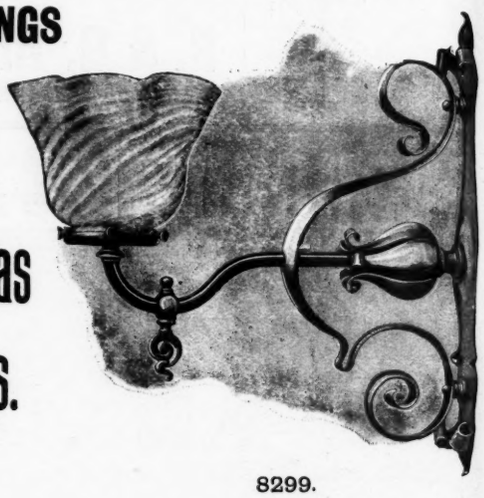
Wrought-Iron Gas-Fittings Manufactory—DRURY LANE, LONDON.

8298.

ANTIQUE FITTINGS

FOR

Ordinary and Incandescent Gas Burners.



8299.

SHOREDITCH DEPÔT--

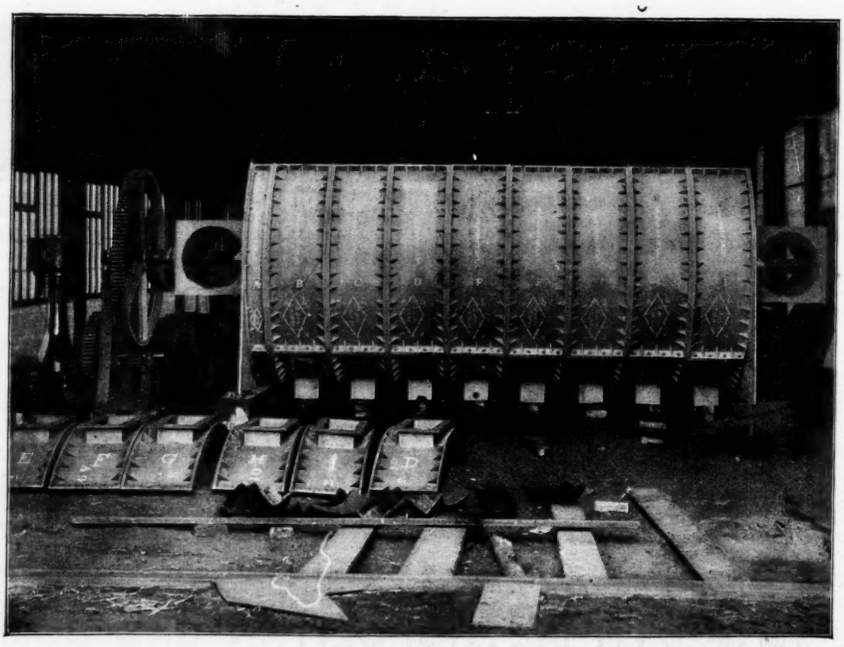
143, HIGH STREET.

THE WHESSOE FOUNDRY CO., LTD.

Works: DARLINGTON.

LARGE AREA OF WASHING SURFACE.

REMOVAL OF THE WHOLE OF THE AMMONIA AND A LARGE PERCENTAGE OF CO_2 AND SH_2.

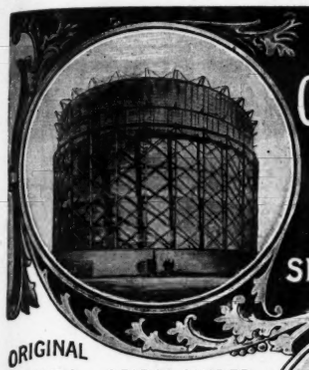


SLIP OF GAS IMPOSSIBLE OWING TO OUR PATENT TELESCOPIC SLIDING JOINT

BUNDLES EASILY ACCESSIBLE FOR CLEANING.

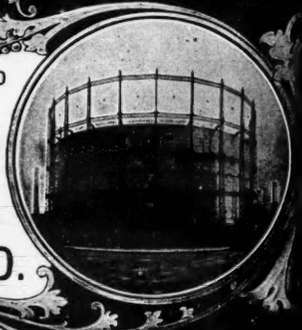
"Whessoe" Rotary Washer-Scrubber (H. Kirkham & Chandler's patent). **Capacity 1,500,000 Cub. ft. per diem.**
One of Two Machines supplied by us to a Foreign Gas-Works, photographed in our shops during course of construction.

London Office: **106, CANNON STREET, E.C.**



THE LARGEST GASHOLDER —IN THE— WORLD.

GASHOLDERS —OF ALL— SIZES AND STYLES.



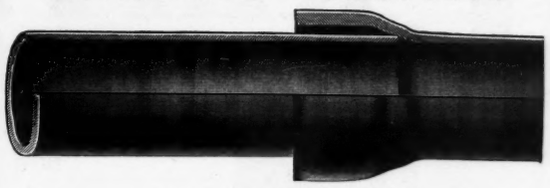
ORIGINAL MAKERS OF SPIRAL GUIDED ..... HOLDERS.

Gasholder WITH LARGEST METAL TANK IN THE WORLD.

GAS PLANT OF EVERY DESCRIPTION ROOFS, TANKS STRUCTURAL STEEL WORK, BOILERS, &c

CLAYTON SON & Co Ld LEEDS.

MANNESMANN



WELDLESS STEEL SPIGOT AND FAUCET PIPES

In any Length up to 40 feet for GAS & WATER MAINS.

A PERFECT SUBSTITUTE FOR CAST-IRON MAINS.

— THE — BRITISH MANNESMANN TUBE Co., — LIMITED, —

110, CANNON STREET, LONDON, E.C.

R. & J. DEMPSTER, Ltd.,

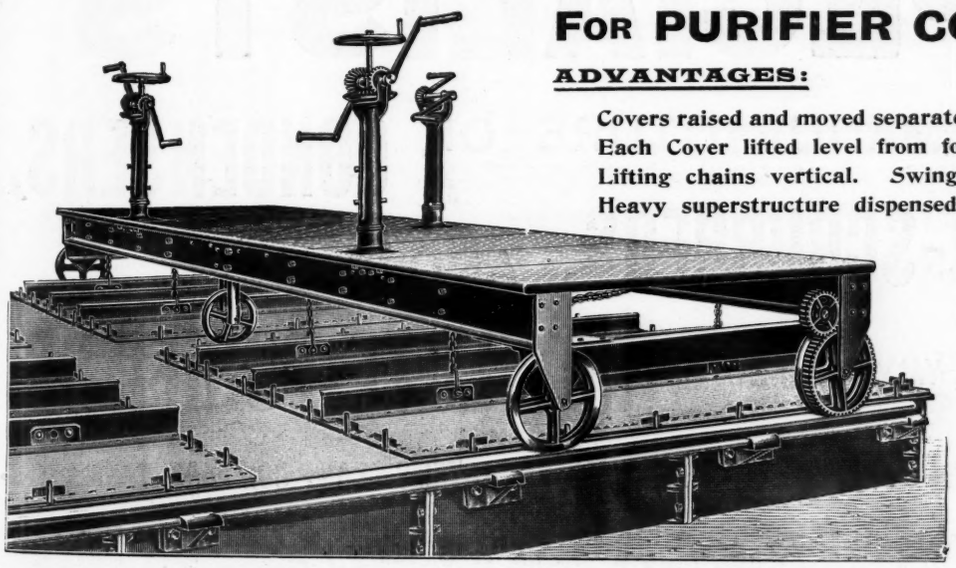
Telegraphic Address: "SCRUBBER MANCHESTER." MANCHESTER.

HOVEY'S PATENT LIFTING CRANE

FOR PURIFIER COVERS.

ADVANTAGES:

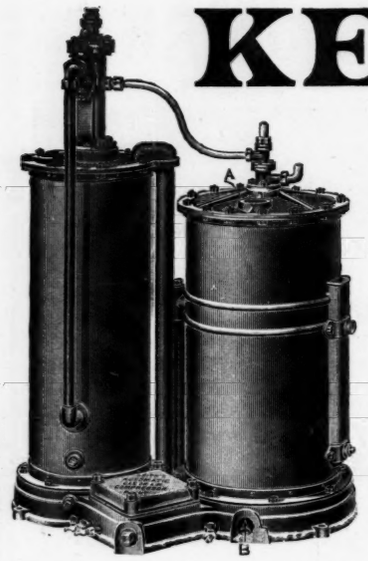
Covers raised and moved separately or Two together.
Each Cover lifted level from four points.
Lifting chains vertical. Swinging avoided.
Heavy superstructure dispensed with.



Prices and Particulars on Application.

London Office: 165, GRESHAM HOUSE, OLD BROAD STREET, E.C.

THE KEITH LIGHT



No. 3 Compressor, enclosed pattern. Water Driven.

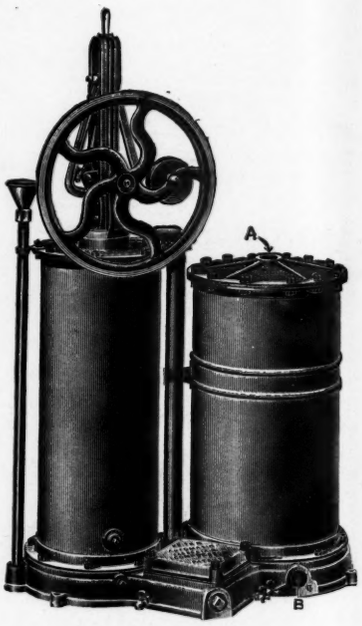
2000 Installations now in use.

Keith's Patent Gas Compressors are perfectly Automatic and require no attention

Non-fluctuating.

Made in various sizes and arranged to give any constant pressure from 2-inch upwards.

DRIVEN BY ANY AVAILABLE POWER.



No. 3 Compressor. Power Driven.

Patentees and Manufacturers—

JAMES KEITH & BLACKMAN CO., LTD.,
27, FARRINGDON AVENUE,
LONDON, E.C.

CLAPHAM BROS., LTD.

ESTABLISHED OVER 60 YEARS.] KEIGHLEY.

SPECIALISTS

IN THE MANUFACTURE OF **CONDENSERS, WASHER-SCRUBBERS,** AND

TAR EXTRACTORS, VALVES, MAINS, DRY LUTE PURIFIERS.

CARBONIZING PLANTS, FOR INCLINED OR HORIZONTAL SYSTEMS. LAMP COLUMNS, TANKS, ETC.

London Representatives: Messrs. JONES & YOUNGER, Chesterfield House, 98, Great Tower Street, E.C.
Scotch Representative: JOHN D. GIBSON, 74, York Street, Glasgow.

Printed for WALTER KING by King, Sell, & Olding, Ltd.; and published by him at 11, BOLT COURT, FLEET STREET, in the CITY OF LONDON.—Tuesday, Nov. 28, 1905.